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TOTAL OZONE DERIVED FROM UV SPECTROPHOTOMETER
MEASUREMENTS ON THE NASA CV-990 AIRCRAFT
FOR THE FALL 1976 LATITUDE SURVEY FLIGHTS

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16 Abstract An ultraviolet interference filter spectrophotometer (UVS) fabricated for aircraft use on the DOT CIAP was modified to use a photodiode and was flown on the NASA Latitude Survey flights in the fall of 1976 Precise calibration of the UVS results in an estimated ± 3 percent absolute accuracy in the calculated columnar ozone values derived from the UV flux measurements. Comparison with Dobson station total ozone values shows agreement between UVS and Dobson total ozone of ± 2 percent. The procedure used to convert UVS measured ozone above the aircraft altitude to total ozone above ground level may introduce an additional 2 percent deviation for very high alti- tude UVS ozone data Under stable aircraft operating conditions, the UVS derived ozone values have a variability, or reproducibility, of better than ± 1 percent. The UVS data from the Latitude Survey flights yield a detailed latitude profile of total ozone over the Pacific Ocean during No- vember 1976. Significant latitudinal structure in total ozone is found at the middle latitudes (30° to 40° N and S). Use of the UVS on future flights is discussed, as well as its use to cross cali- brate Dobson and filter ozonometer stations and to provide ground truth for satellite ozone data			
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FOREWORD

The ultraviolet spectrophotometer (UVS) was originally fabricated for the DOT Climatic Impact Assessment Program, for which the Project Manager was Mr. A. J. Grobecker. The Deputy Project Manager was Mr. Samuel C. Coroniti, whose guidance contributed significantly to the overall success of our work on that program, as summarized in the FINAL CIAP REPORT, PANA-UVS-7 (December 1975).

The UVS was first flown in the NASA CV-990 in the fall of 1975, the project was supported by the NASA Lewis Research Center through the Office of Naval Research. Technical guidance was provided by Mr. Porter J. Perkins of the Lewis Research Center, Mr. Louis C. Haughney was the Mission Manager for these Global Atmospheric Sampling Program (GASP) flights, and the in-flight experimenter was Mr. Daniel C. Briehl.

The fall 1976 use of the UVS for the NASA Latitude Survey flights was supported by the Lewis Research Center and carried out under the direction of Mr. Daniel C. Briehl.

All the UVS data (ozone values and fluxes) presented here have been archived on a magnetic tape at the Lewis Research Center. The tape contains all data to 75° solar zenith angles and for altitudes above 5000 feet. These data are more extensive than those tabulated in this report, which cut off at the 65° solar zenith angle and below 10 000 feet. Copies of this tape may be obtained from Mr. Daniel C. Briehl at the Lewis Research Center.

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I. INTRODUCTION

The UVS was developed by Panametrics, Inc. for the CIAP program (Ref. 1.1), during which an extensive upper atmosphere monitoring system was installed (Ref. 1.2) on the high altitude WB57F. The UVS was flown successfully on more than 80 missions during the course of about three years of measurements. The structure of UV flux vs latitude and longitude was measured in much greater detail than had ever been possible before, and by use of the data (in the Hartley-Huggins bands) computer-based mathematical techniques were developed for deduction of the total ozone above the aircraft. As a result of this experience we became convinced (Ref. 1.3) that such a UV spectrophotometer (UVS) would make a useful addition to both the 747 and CV-990 instrument packages as part of the NASA Global Air Sampling Program (GASP).

As a consequence of the foregoing, a preliminary operational test of the UVS on the CV-990 was carried out (Ref. 1.4) with very satisfactory results. Several desirable changes in the instrument design became obvious as a result of this test, including replacement of the photomultiplier by a UV photodiode. Thus, a follow-on effort took place in which (1) the modifications were made, (2) a much more extensive series of CV-990 tests occurred (Oct-Nov 1976), and (3) computer-based data reduction procedures were developed. The operational tests have been completely successful, and we believe that a similar UVS package could, in fact, be designed for long-term operation on the CV-990, 747 or other high altitude aircraft.

The desirability of replacing the photomultiplier with the photodiode, when long-term application is the objective, was discussed in Ref. 1.4. Basically, the photodiode is inherently more stable and less temperature sensitive. The photosensitivity, however, is much less. This has made it necessary to install a lens and larger area collimators than were used with the photomultiplier. All modification, installation and flight work was completed successfully, and is discussed in Section 2.

In Section 3 the calibration effort is discussed. Use of the larger area collimators and the lenses causes the light rays to pass through the filters at much larger angular deviation from the normal than was the case with the photomultiplier. The addition of the quartz lens increased the angular deviation sufficiently to cause about a 1% downward shift in the effective filter wavelengths. As discussed in Section 3, it was found during the program development that the ozone overburden calculation was strongly affected. This is because it is necessary to calculate the ozone absorption coefficient at a specific wavelength, and an uncertainty even as small as 1% in that wavelength can lead to large errors in the ozone overburden calculation. A procedure was developed which allows the effective wavelength shift to be measured to better than 0.1%, which results in an error in the calculated total ozone of less than a few percent.

Information about the UVS flights is given in Section 4. Most of the data were obtained on the 15 Latitude Survey Flights in the fall of 1976. Magnetic tape data from the GASP flights in the fall of 1975 were also analyzed.

Flight results are presented in Section 5. The analysis procedure is briefly outlined there, with only changes from the more detailed discussion in Refs. 1.5 and 1.6 being described fully. Tabular listing of the 1976 and 1975 results are presented, and a comparison with Dobson station measurements is made. It is found that for the Dobson data presently available, the average agreement is better than a few percent. Some plots of the ozone data are presented for flights where interesting structure shows up. Conclusions and Recommendations are given in Section 6.

2. PHOTODIODE VERSION OF THE UV SPECTROPHOTOMETER USED FOR THE FALL 1976 FLIGHTS

The basic structure of the UVS has been described earlier in Refs. 1.1, 1.5 and 1.6, with the modifications necessary for flight in the CV-990 being described in Ref. 1.4. For the fall 1976 flights, the major modification involved replacement of the photomultiplier with a photodiode to reduce the instrument's internal power dissipation and to obtain a less temperature-sensitive signal. The UVS incorporating the photodiode was successfully flown aboard Galileo II on June 28 and June 30, 1976. Results from those test flights were summarized in a letter report (Ref. 2.1) and proved the suitability of that design concept for application on the CV-990. It further showed the desirability of improving the response characteristic of the system including that of the electronics. These modifications are detailed below.

The optics of the UVS has been modified by introducing a biconvex lens between the diffuser and the filter wheel. Additionally, the collimators over the bandpass filters have been replaced with larger area ones. Both measures serve to increase the light intensity incident on the photodiode. A diagram of the so modified optical system of the UVS is shown in Fig. 2.1. To improve the acceptance angle of the instrument when installed in the aircraft, a new mounting arrangement was designed and constructed permitting flush mounting. The UVS is mounted on a 1/2 in. aluminum plate (Al6061-T6) such that the collimator projects through and 1/4 in. above that plate. A gasket is provided between the instrument and the plate. The latter is substituted for the quartz window in the second zenith port. The acceptance half angle in this configuration is 75° from the vertical.

The self-calibrating feature of the system is accomplished with a LED light source which is activated during a time period equivalent to one filter position interval. To match the lower sensitivity of the photodiode the light

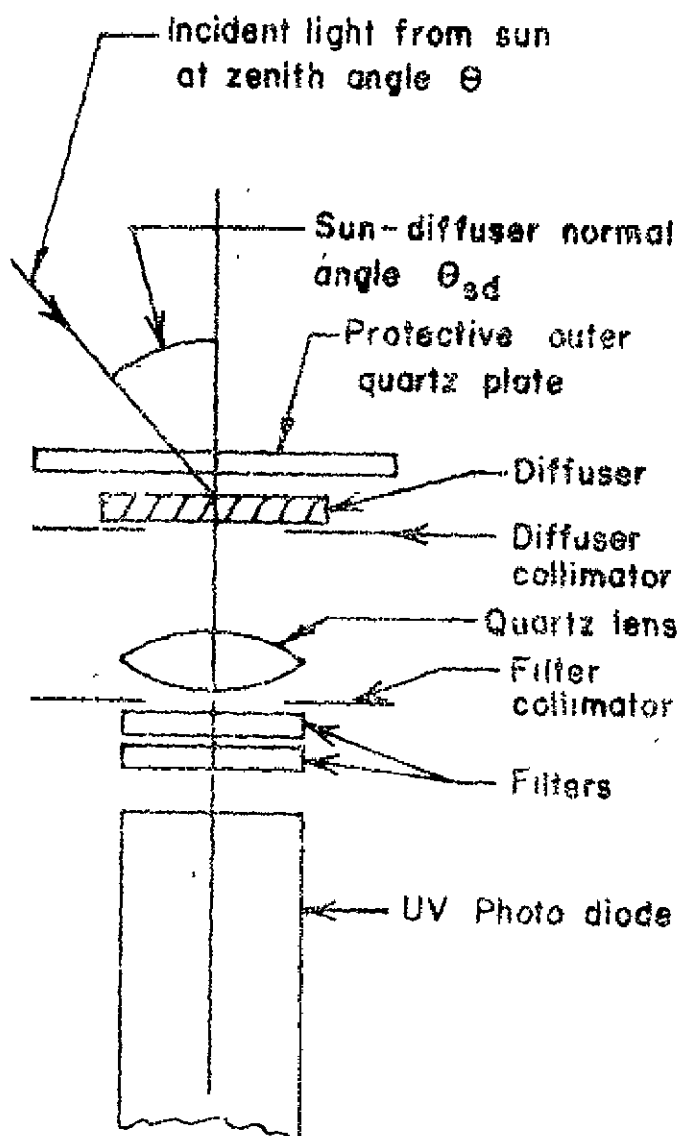


Fig. 2.1 Optical System Outline for the UVS Photodiode Version.

source had to be replaced with an LED of higher intensity in the red spectrum. The originally fixed calibration period of 1 sec. has been modified to assure automatically the same value as the sampling interval of the filters. This interval is selectable as 1 sec. or 10 sec.

In order for the existing logarithmic electrometer to process the low photodiode currents (dark current $\approx 3 \times 10^{-12}$ A) it was necessary to introduce further amplification. This has been accomplished with a linear current-to-voltage preamplifier with a conversion gain of 1 mV per 1×10^{-12} A. Since the log electrometer is a current input device, it had to be converted for voltage input signals by addition of a resistor. Results of temperature tests with the preamplifier/electrometer combination are discussed below. During these tests it was necessary to measure the interval temperature from -15°C to $+70^{\circ}\text{C}$. Therefore, the temperature monitoring circuit has been redesigned to encompass that range.

The preamplifier/electrometer configuration as flown during the latitude survey mission was tested over a temperature range of 0°C to $+30^{\circ}\text{C}$ to verify proper operation of the amplifier during flight. Actual internal system temperature varied between 15°C and 17°C on all 14 missions. The tests showed that below about 10°C and above 25°C considerable errors are introduced - mainly due to the electrometer input offset voltage - which is temperature dependent. If it is remembered that the electrometer has been converted to measure voltage, it becomes clear that an offset of only $100\mu\text{V}$ (typical TC of offset is $25\mu\text{V}/^{\circ}\text{C}$, max. $60\mu\text{V}/^{\circ}\text{C}$) results in a 10% error at an equivalent input current of 1×10^{-12} A. This error reduces to 1% at 1×10^{-11} A and becomes inconsequential at higher currents. Since the instrument calibration is made at light levels equivalent to photodiode currents above 10^{-11} A, errors at the above stated flight temperatures are negligible. Nevertheless, it was obvious that an increased temperature range of -15°C to $+70^{\circ}\text{C}$, as tentatively specified for the Boeing 747 operation, would pose a problem. Therefore a new electrometer which does not require a preamplifier has been designed and a breadboard constructed. It employs low leakage MOS-FET transistors for the logarithmic feedback element and the reference source. This design measures the photodiode current directly without conversion to a voltage, and therefore the amplifier offset voltage has a negligible temperature effect. The main deviation (from exact logarithmic response) at low currents is contributed by the temperature dependent input bias current and the leakage current of the logarithmic element. Both currents double for every $+10^{\circ}\text{C}$. At higher currents, gain effects are the main contributor. A temperature test was conducted over the range -15°C to 70°C . From the 25°C reference temperature the input reference deviation increases exponentially with temperature. It is 7% at $+60^{\circ}\text{C}$ and 2% at 0°C for the input currents to be measured. Since the deviation is symmetrical about the reference point and increases monotonically, it may be extrapolated to yield a maximum deviation of 9%

at the temperature extremes of -15°C and 65°C . The latter represents the recommended upper limit for the photodiode. It should be noted that under actual flight conditions the internal temperature of the UVS will not change more than 5°C due to its temperature control. It is only during ground check-out that the 65°C limit could be reached. Therefore, we can expect amplifier induced deviation to be $<1\%$ under flight conditions; since the internal temperature of the housing is measured, even this small deviation can be taken into account.

The relatively low operating altitude of the CV-990 (≤ 40 kft) made it unlikely that useful UV fluxes would be measured by the 214 and 287 nm filter sets, so they were replaced by 374.1 and 312.8 nm wide-band filters to test the possibility of obtaining total ozone measurements with just two wide-band filters. In addition, the 297.8 nm filter set, which had deteriorated significantly, was replaced with a new set at 294.5 nm. More details about the filter sets used are given in Section 3 (Calibration).

The modified system including test console and a 2 channel strip chart recorder was installed in the CV-990 at Ames Research Center, California, on October 18 and October 19, 1976. At this time the system was integrated with the on-board data recording system and tested on the ground. Two outputs, UV signal and multiplexer, were connected to the digital recorder, as well as to the strip chart recorder. No difficulties were encountered and the system performed within specifications. On October 26, 1976 a Panametrics engineer verified system operation on a NASA conducted check-out flight. All systems parameters tested out as expected. NASA personnel were instructed about the operation of the instrument for the subsequent latitude survey mission starting October 28 and ending November 18, 1976. During this time a total of 14 flights were conducted with the UVS operating properly for each flight.

3. CALIBRATION

3.1 Response Calculation

The response of the UVS was calculated as described in Ref. 1.1, 1.5 and 1.6, with the photodiode detection efficiency used in place of that for the photomultiplier. A number of additional changes and improvements have also been made in the calculations. The solar response calculations were originally set up to use the 5 nm averaged spectrum recommended by Thekaekara (Ref. 3.1). Recently, a more resolved solar spectrum has been given by DeLuisi (Ref. 3.2), and this spectrum, averaged over 1 nm intervals, has been used for the present calculations.

The original calculations used the room temperature ozone absorption coefficient measurements of Inn and Tanaka (Ref. 3.3). Since most of the

atmospheric ozone is in the stratosphere at temperatures near -50°C , these measurements have been converted to a temperature of -51.5°C using the data of Vigroux (Ref. 3.4). Measurements by Griggs (Ref. 3.5) indicate that the absorption coefficient measurements of Inn and Tanaka (Ref. 3.3) are the most accurate at room temperature.

The transmission curves of all filter sets was also remeasured, and the new values used in the calculations. Most filters showed negligible changes from the original values measured four years earlier, but a few showed moderate changes in the peak transmission and blocking transmission, while one set (297.8 nm) showed significant deterioration and was replaced.

A final correction is made by shifting the wavelengths of all filter transmission curves to correct for the effect of the quartz lens. This effect, and the precise measurement of the shift factor, is discussed more fully in Section 3.3.

The response for each filter set is calculated for both the solar spectrum and the calibration (Standard of Spectral Irradiance - SSI) spectrum. The ratio is then used to correct the measured calibration response to an equivalent solar response. The solar response is also calculated with attenuation by several values of total ozone thickness, to enable an effective ozone absorption coefficient to be calculated for each filter set. These effective absorption coefficients are used to calculate total ozone as described more fully in Section 5.

3.2 Calibration

The UV Spectrophotometer (UVS) is calibrated with a Standard of Spectral Irradiance (SSI) before and after each series of flights. The SSI is a 200 W tungsten halogen lamp with a quartz envelope, and its calibration is traceable to the National Bureau of Standards. Since the unattenuated solar spectrum differs slightly in shape from the SSI spectrum, a small correction is made to the SSI calibration to provide a calibration for the solar spectrum. More details about the calibration procedure are given in Refs. 1.1, 1.5 and 1.6. In general, it has been found that the calibration shifts only a few percent over several months, so the SSI accuracy of several percent is not compromised.

The calibration data for the fall 1976 flights are given in Table 3.1. Listed are the average wavelength for detected light for unattenuated sunlight, with all corrections described in Section 3.1 included, the bandpass for each filter (full width at half of peak transmission), and the measured calibration sensitivity converted to the unattenuated solar spectrum.

Table 3.1

UVS Calibration for Latitude Survey Flights
in the Fall, 1976

Filter position no.	Average wavelength $\bar{\lambda}$ (nm)	Bandpass (nm)	Solar spectral sensitivity at $\bar{\lambda}$ (A/(W/(cm ² -nm)))
1	374.1	10	2.700×10^{-3}
2	312.8	14	1.203×10^{-2}
3	289.2	2.5	1.845×10^{-2}
4	294.5	2.1	2.248×10^{-2}
5	303.9	3.0	6.301×10^{-2}
6	308.4	2.9	1.691×10^{-2}
7	318.8	3.4	1.716×10^{-2}
8	326.1	2.5	1.644×10^{-2}
9	365.5	28	4.699×10^{-3}
10	395.6	26	6.067×10^{-3}

3.3 Measurement of Effective Wavelengths

A brief survey of the UVS strip chart data from the fall 1976 flights showed that all monitor voltages were within the proper operating range, and the solar flux outputs appeared reasonable. Preliminary calculation of the ozone thickness using the effective absorption coefficients calculated from the original filter transmission measurements gave inconsistent results, however. The ozone thicknesses were far greater than any measured before with the UVS, and each filter set gave a different value. After remeasuring the temperature stability of the UVS calibration, the diffuser angular response, and the filter set transmissions, it was finally concluded that the quartz lens used before the filters, in combination with the large collimator apertures, was increasing the average angle of incidence of the light on the filters sufficiently to shift the effective bandpass by about 1% toward shorter wavelengths. The above conclusion was confirmed by measuring the attenuation of the Standard of Spectral Irradiance (SSI) calibration by a piece of 0-53 Corning Glass. The transmission curve of this glass was measured, and this allowed the measured calibration attenuation for each filter set to be converted into an effective wavelength shift. The average for all narrow bandpass filters was measured to be $\lambda_{\text{eff}} \approx \lambda_o \times 0.990$, where λ_{eff} is the effective bandpass wavelength and λ_o is the measured bandpass wavelength for normally incident light.

The effective bandpass wavelength at an average angle of incidence of $\bar{\theta}$ to the filter normal can be written as

$$\lambda_{\text{eff}} = \lambda_o (1 - \sin^2 \bar{\theta} / 2.1)^{1/2} \quad (3.1)$$

For the UVS with the photomultiplier $\bar{\theta} \lesssim 2^\circ$, and λ_{eff} differs from λ_o by about 0.03%, which is negligible. Only for $\bar{\theta} = 12^\circ$ does $\lambda_{\text{eff}} = 0.990 \lambda_o$. Rough calculations for the UVS with the photodiode indicated that λ_{eff} should not deviate importantly from λ_o , and approximate ozone calculations from the June 28-30, 1976 UVS test flights gave reasonable values (Ref. 2.1). However, addition of the quartz lens for the Oct. -Nov. 1976 UVS flights, while increasing the narrow bandpass filter signals a factor of two, also made $\bar{\theta}$ large enough so that the shift in λ_{eff} became important. Measurement of the λ_{eff} shift, as described above, allows recalculation of the effective ozone absorption coefficients, and thus calculation of better values for the ozone thicknesses.

The above procedure for measuring λ_{eff} has an additional advantage, in terms of long term system applications, which should be noted here.

By including this measurement of the SSI calibration attenuation by 0-53 Corning Glass, it becomes feasible to check for shifts in the bandpass wavelengths during routine maintenance and recalibration of the UVS. This is a much simpler procedure than remeasuring filter transmissions, and would be an important check on stability for an operational set of UVS instruments.

The wavelength shift factor has been measured to be 0.990 ± 0.001 . This corresponds to $\pm 3\%$ in the measured total ozone. For the arrangement without the quartz lens the shift factor was measured to be 0.999 ± 0.001 , in agreement with findings from the June 1976 UVS test flights that no significant shift is present without the quartz lens.

4. FLIGHT INFORMATION

4.1 Latitude Survey Flights - Fall 1976

A complete list of all Latitude Survey flights for the fall of 1976 is given in Table 4.1. All were made by the Galileo II CV-990 aircraft. The date(s), GMT range, and approximate latitude-longitude range covered are all listed. Flight 1 was for checkout and the UVS was attended by Panametrics personnel. For all others the UVS was operated by NASA personnel. The UVS operated properly on all flights, although the amount of data for some is small because of large solar zenith angles during most of the flight.

4.2 GASP/JPL Flights - Fall 1975

Table 4.2 gives a complete listing of all GASP flights of Galileo II, including those conducted for the Jet Propulsion Laboratory (JPL) for the period November 25 to December 16, 1975. Columns 1-3 give the flight number, description and date of this flight series, respectively, while Column 4 indicates the range of latitude and longitude for each mission. The UV Spectrophotometer was on-board and operational for the entire flight series. The instrument was attended by Panametrics personnel during flight Nos. 2, 3 and 4. During all other missions, including the test flight on November 25, 1975, personnel from NASA-Lewis Research Center operated the instrument successfully.

The local test flight (No. 1) was intended as an operational check of all instrumentation aboard the aircraft and the UVS was only turned on for 2 short periods of time. Its operation proved to be satisfactory, and the instrument was deemed flightworthy. The flight west to east (No. 2) was a chase flight in the wake of a United Airlines 747 from Moffet Field, California to Patrick Air Force Base (PAFB), Florida. Number 3 was a step profile flight over Wallops Island, and was coordinated with the launch of a balloon borne ozone sonde from that island. Although flights 4 through

Table 4.1

Summary of Latitude Survey Flights for the Fall of 1976

Flt. No.	Date (1976) (Mo-day)	Approx. GMT range (hrs-min)	Approximate location range (lat., long.) (deg N, deg E)
1	Oct. 26-27	1940-0140	(37, -122) - (40, -105)
2	Oct. 28-29	2130-0205	(38, -122) - (65, -148)
3	Oct. 29-30	1905-0055	(65, -148) - (75, -142) - (65, -148)
4	Oct. 30	1640-2240	(65, -148) - (21, -157)
5	Nov. 1	1530-2010	(21, -158) - (14, -157) - (21, -158)
6	Nov. 3	1950-2310	(21, -158) - (10, -161) - (21, -158)
7	Nov. 7-8	2040-0115	(21, -158) - (-11, -169)
8	Nov. 8-9	2110-0555	(-14, -171) - (-38, 145)
9	Nov. 10-11	1815-0010	(-36, 141) - (-43, 147)
10	Nov. 11	1935-2245	(-38, 145) - (-34, 142) - (-38, 145)
11	Nov. 12-13	2310-0405	(-38, 145) - (-55, 159) - (-43, 173)
12	Nov. 14	0245-0810	(-43, 173) - (-62, 171) - (-43, 173)
13	Nov. 16	0045-0600	(-43, 173) - (-14, -170)
14	Nov. 17-18	2215-0410	(-14, -170) - (21, -158)
15	Nov. 18	1845-2315	(21, -158) - (37, -122)

Table 4.2

Summary of GASP/JPL Flights for the Fall of 1975

<u>No.</u>	<u>Flight Description</u>	<u>Date (1975)</u> <u>Month-Day</u>	<u>Approximate location range</u> <u>(Lat., Long.)</u> <u>(deg. N, deg. W)</u>
1	Local test	Nov. 25	(37, 122)
2	W to E Chase	Nov. 28	(37, 122) - (43, 83)
3	Wallops/Balloon	Dec. 2	(28, 80) - (39, 74)
4	JPL	Dec. 4	(28, 80) - (31, 77)
5	"	Dec. 6	(28, 80) - (30, 79)
6	"	Dec. 8	(28, 80) - (40, 78)
7	"	Dec. 10	(28, 80) - (30, 80)
8	"	Dec. 12	(28, 80) - (38, 77)
9	"	Dec. 14	(28, 80) - (31, 81)
10	"	Dec. 15	(28, 80) - (31, 82)
11	E to W Return	Dec. 16	(30, 82) - (37, 122)

10 were mainly conducted for JPL to test various radar equipment, the UVS was operational during those missions as well. The return trip from the east to the west coast concluded this series.

The major conclusions from the 1975 flights were presented in Ref. 1.4, with some of the results also presented in Ref. 4.1,

5. FLIGHT RESULTS

5.1 Data Reduction Procedure

5.1.1 Analysis Equations

The basic analysis equations are the same as given in Section 2 of Ref. 1.6, except that the method of calculating the leakage flux $B_\ell(\lambda)$ for the filter set of average wavelength λ has been modified. The modified method uses

$$B_\ell(\lambda) = B_k(\lambda) F_{\text{tot m}}(\theta, \lambda_b) \quad (5.1)$$

with

$$B_k(\lambda) = \frac{F_o(\lambda)}{F_o(\lambda_b)} \frac{B_o(\lambda)}{B_o(\lambda) + S_o(\lambda)} \quad (5.2)$$

The symbols have the same meaning as in Ref. 1.6, with $F_{\text{tot m}}(\theta, \lambda_b)$ being the measured downward flux for the filter λ_b used to find the leakage flux, $\lambda_b = 365.5$ nm for the filter set used with the photodiode UVS in the fall of 1976. $F_o(\lambda)$ and $F_o(\lambda_b)$ are the unattenuated solar fluxes at λ and λ_b . $B_o(\lambda)$ and $S_o(\lambda)$ are obtained from the theoretically calculated solar responses, $S_c(\lambda, t_{o3})$, for $t_{o3} = 0, 0.3$ and 0.6 atm-cm of ozone attenuation. The three calculated responses are fit by

$$S_c(\lambda, t_{o3}) = S_o(\lambda) e^{-\mu_{o3}(\lambda) t_{o3}} + B_o(\lambda) \quad (5.3)$$

with $\mu_{o3}(\lambda)$ also being determined from this fit. Essentially, $B_o(\lambda)$ is the leakage response, and $S_o(\lambda)$ the bandpass response, both for unattenuated sunlight (no Rayleigh scattering or ozone attenuation). The value for $\mu_{o3}(\lambda)$ derived in this way is used to calculate the total ozone thickness as described in Ref. 1.6.

The total ozone thickness is calculated in two ways. One value is obtained by referencing each narrow-band filter output to that of the 365.5 and 395.6 broad-band filters to obtain a $t_{o3}(\lambda)$, as described in Ref. 1.6.

A weight $w(\lambda)$ is also calculated and used to obtain an average \bar{t}_{O_3} . A second value for the total ozone is calculated by using adjacent (in wavelength) narrow-band filters to obtain

$$t_{O_3a}(\lambda_1) = \frac{-\cos\theta}{(\mu_{O_3}(\lambda_1) - \mu_{O_3}(\lambda_2))} \times \ln \left\{ \frac{F_{totm}(\theta, \lambda_1)}{F_{toto}(\theta, \lambda_1)} \frac{F_{toto}(\theta, \lambda_2)}{F_{totm}(\theta, \lambda_2)} \right\} \quad (5.4)$$

A modified weighting function

$$w_a(\lambda_1) = w(\lambda_1) \frac{F_{totm}(\lambda_2)}{F_{toto}(\lambda_2)} \quad (5.5)$$

is used to calculate a second average \bar{t}_{O_3a} . The final value for total ozone is taken as the average of \bar{t}_{O_3} and \bar{t}_{O_3a} . These two values generally are equal to within a few percent, and the lack of this near equality can be used as a test for data inconsistency.

An additional calculation is made to correct the measured total ozone above the flight altitude to the total ozone above ground level. The method has been discussed in Ref. 5.1, and is based on the results of Ref. 5.2. If the aircraft is flying at altitude A (km), an approximate correction to obtain ground level ($A=0$) total ozone thickness can be made using the ozone density measurement at the aircraft altitude, $\rho_{O_3}(A)$ (mol/cm³). This can be readily shown using the monthly and annual average vertical ozone profiles given in Ref. 5.2. A survey of the data suggests that total ozone above ground level can be derived as

$$t_{O_3}(A=0) \simeq \frac{t_{O_3}(A)}{F_1(A) \times F_2(\rho_{O_3}(A))} \quad (5.6)$$

where

$$F_1(A) = 1.005 - 0.006 A(\text{km}) \quad (5.7)$$

and $F_2(\rho_{O_3})$ is given by the solid curve in Fig. 5.1. The points in Fig. 5.1 are values of $F_2(\rho_{O_3}(A))$ calculated from the monthly and annual averages of Ref. 5.1. The residual ozone above 35 km was calculated using the 7 km pressure scale height from Ref. 5.3 and the 32.5 km ozone densities of Ref. 5.2, and it generally amounted to between 5 and 20%. The calculations were made for altitudes of 7.5, 10 and 12.5 km (24600, 32800, and 41000 ft), the approximate range of expected flight altitudes.

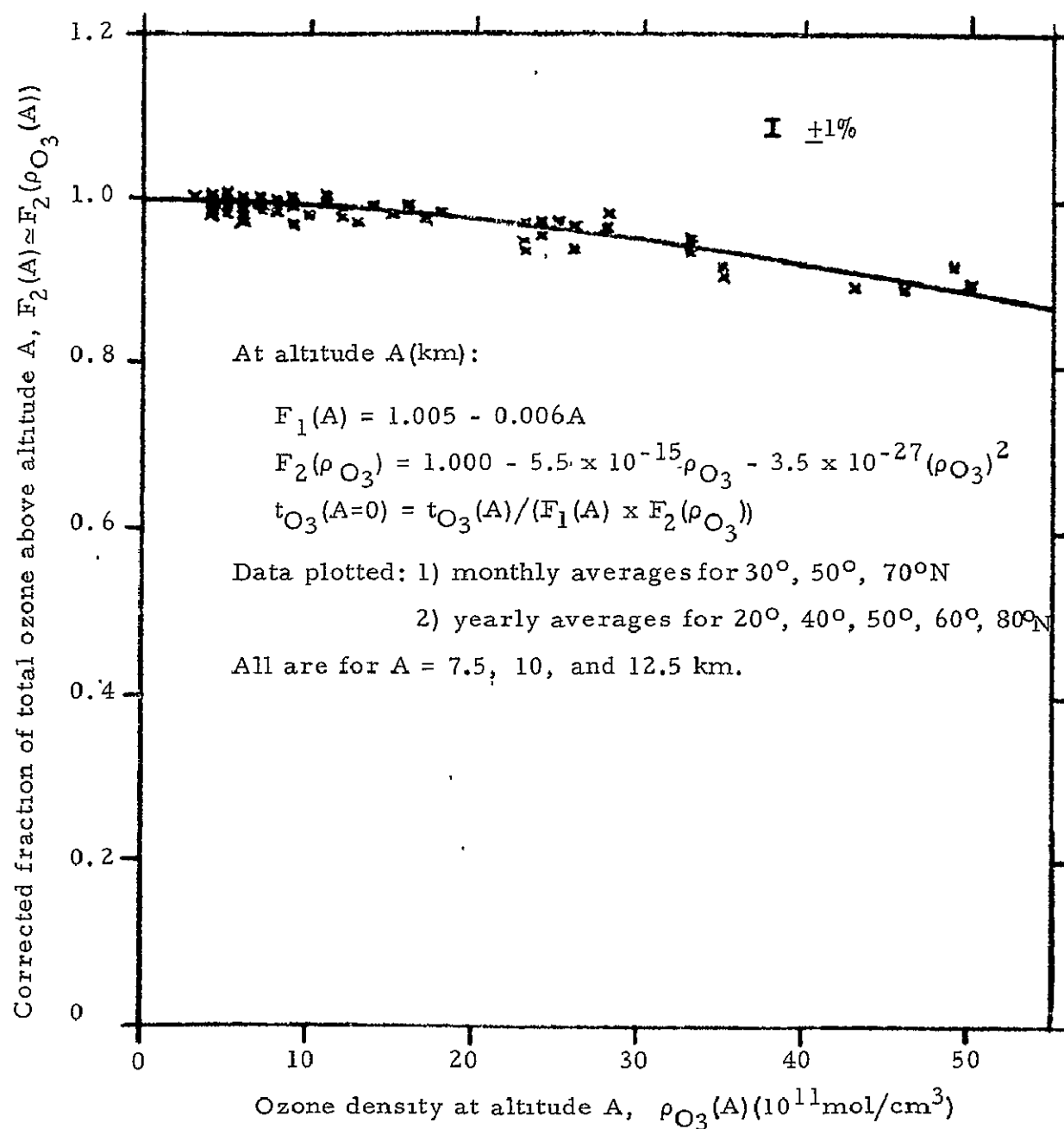


Fig. 5.1 Graph Showing Accuracy of Approximate Method of Correcting Total Ozone Measurement for Partial Penetration of the Ozone Layer.

The curve in Fig. 5.1 can be fitted by

$$F_2(\rho_{O_3}) = 1.000 - 5.5 \times 10^{-15} \rho_{O_3} - 3.5 \times 10^{-27} (\rho_{O_3})^2 \quad (5.8)$$

where ρ_{O_3} is in mol/cm^3 . The results in Fig. 5.1 show that, on the average, it should be possible to calculate the total ozone above ground level to a few percent using only $t_{O_3}(A)$ and $\rho_{O_3}(A)$, although it is possible that inclusion of geographical effects could improve the calculation. The values of ρ_{O_3} used to calculate $F_2(\rho_{O_3})$ are obtained from the measured ozone concentrations and the static air temperature, which are available from the magnetic tape recorded data for the Latitude Survey flights. The conversion is

$$\rho_{O_3} = \frac{P \times (PPB) \times 2.652 \times 10^7}{1 + T/273.16} \text{ mol}/\text{cm}^3 \quad (5.9)$$

where P is the ambient pressure in mb, (PPB) the measured ozone concentration in parts per billion, and T the static air temperature in deg C. P is readily obtained from the pressure altitude.

All other analysis equations are as given in Ref. 1.6, and will not be repeated here. The above changes and additions are the only modifications in the data analysis procedure.

5.1.2 Computer Reduction Methods

The digital magnetic tape data of the UVS are computer processed in four major steps, using four main programs written in Fortran, and three subroutines (in MACRO for the DEC PDP-10 Computer used for the processing), which do the necessary tape data handling and bit processing. Each main program reads an input tape and writes an output tape for the next main program (except for the last), and writes line-printer output which duplicates the magnetic tape output for visual use. The general flow of the computer processing is shown in Fig. 5.2.

The raw data for the Latitude Survey Flights for the Fall of 1976 consist of about two dozen digital magnetic tapes. The data necessary to process the UVS output forms only a portion of the total data on these tapes. Thus the first stage of processing is by a main program NASARD, F4, which reads the NASA-supplied tapes, strips and decodes the needed data, and writes it onto an output tape. This reduces the amount of tape needed by nearly an order of magnitude.

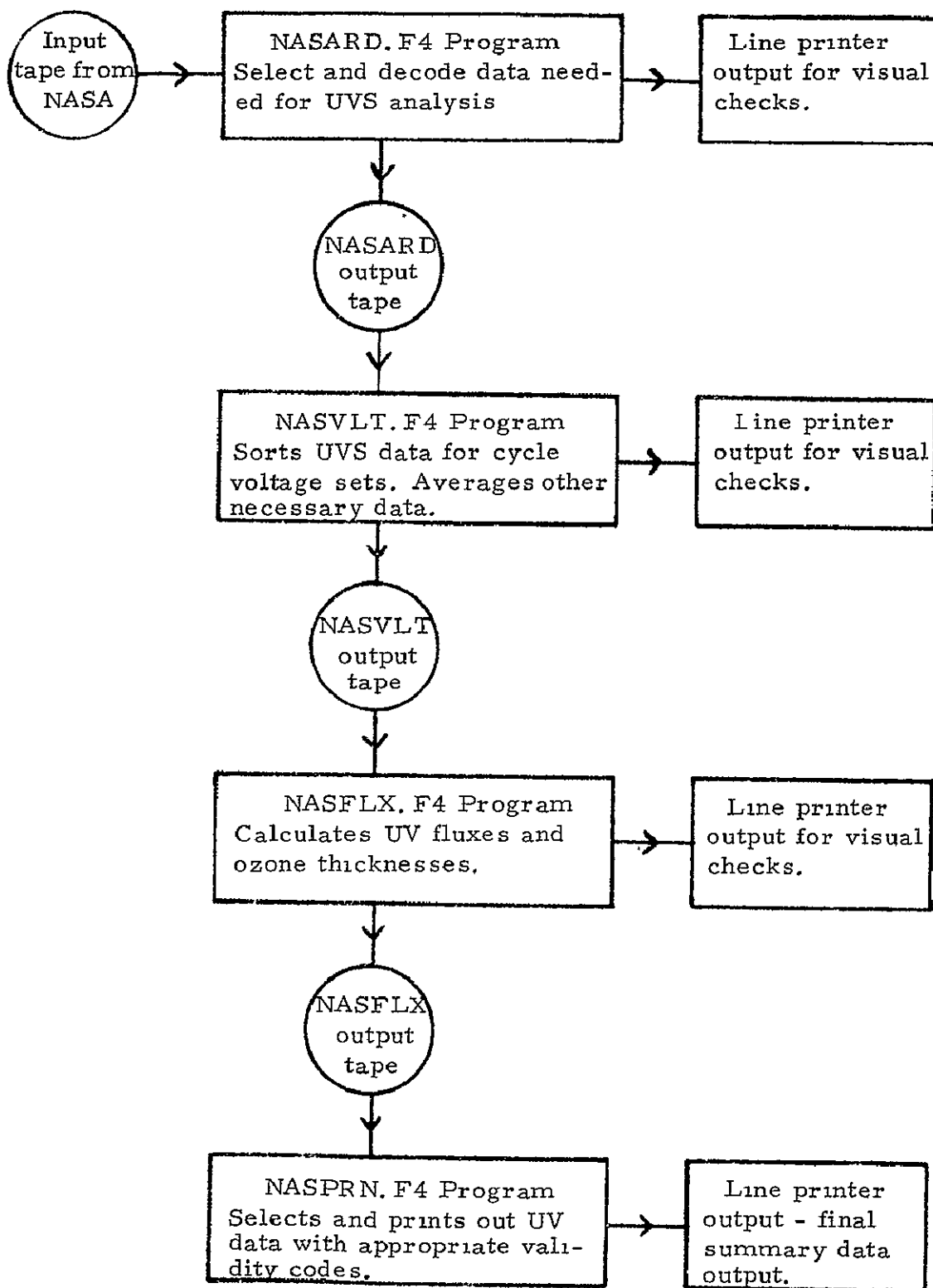


Fig. 5.2. Outline of Work Flow in Computer Processing of UVS Magnetic Tape Data.

The line printer output from the NASARD.F4 program is used to select processing times for the next step, NASVLT.F4, and to obtain the necessary starting parameters. The second main program, NASVLT.F4, averages the digitized UVS voltages to obtain a set of 13 average voltages (dark, 10 filters, 2 cal levels) and their standard deviations for each complete UVS filter wheel cycle. The necessary auxiliary data (latitude, etc.) are also averaged for each complete UVS cycle, with standard deviations, maxima, and minima also calculated. All auxiliary data are tested for deviations from a running average to avoid including noise. The amount of output magnetic tape from NASVLT.F4 is about an order of magnitude reduction from the input tape amount.

The UV fluxes and ozone values are calculated by NASFLX.F4, which reads the NASVLT.F4 output tape. The fluxes, total ozone, and other data are output onto another magnetic tape. The output tape amount from NASFLX.F4 is about equal to the input tape amount.

The final summary print-outs are made by the fourth main program, NASPRN.F4. This program selects the desired time range of data, generates appropriate validity codes (see Sections 5.2 and 5.3), and prints out the results in summary form. These final summaries have been reduced for tabular inclusion in this report.

5.1.3 Modifications for the 1975 Flights

Processing of the magnetic tape data for the Fall 1975 GASP flights was identical to that just described for the 1976 Latitude Survey flights, except that the programs were modified for the differences in data format and analysis procedure. The NASARD.F4 program required only minor modifications because of slight format changes. NASVLT.F4 required some modification because the two calibration level steps were only 0.5 sec long each, rather than the 5 sec of the Fall 1976 data.

The major modification for NASFLX.F4 was for the UVS-photomultiplier combinations, and inclusion of the 59 degree cut-off for the solar zenith angle. This was accomplished by using a modified diffuser efficiency for direct sunlight for sun-detector normal angles greater than 58°. The modified diffuser efficiency is

$$R_1(\theta) = R(\theta) \left[0.001 + 0.999e^{-(\theta - 58)^2/4} \right] \quad (5.10)$$

$\theta \geq 58 \text{ deg}$

where $R(\theta)$ is the non-cut-off calculated relative diffuser efficiency, and θ is in degrees. This function provides a suitable roll-off from direct and Rayleigh scattered light response to pure Rayleigh scattered light response.

The quartz window in the CV-990 is expected to reflect about 8% of the incident light, and this effect has not been included in the analysis of the UVS data. Thus the UVS measured fluxes should be systematically low by about 8% for the 1975 GASP/JPL flights. The ozone thicknesses should not be significantly affected because they are calculated from flux ratios.

The ozone thicknesses calculated for solar zenith angles greater than 60 deg have a greater uncertainty than for smaller angles. This is because the Rayleigh scattered light is not calculated as accurately as the direct sunlight component, and the ozone thicknesses are calculated from the ratios of measured and calculated fluxes (see Eq. (5.4)). For $\theta_{\text{sun}} > 60^\circ$ most of the detected light is Rayleigh scattered, with the exception of a small amount of direct sunlight scattered by dirt, scratches and imperfections of the quartz window (which is roughly included by the 0.001 term in the brackets in (5.10)), and so results in decreased accuracy.

The ozone thicknesses calculated from adjacent (in wavelength) filters are expected to be more accurate than those calculated from reference to the 371.3 and 401.9 nm filters. This is quite evident in the data, where for $\theta_{\text{sun}} < 59^\circ$ the two methods give nearly identical ozone thicknesses, but for $\theta_{\text{sun}} > 60^\circ$ the latter method gives thicknesses which appear to be about 20% too large. Thus the NASPRN.F4 program was modified for the 1975 GASP data to print out only the adjacent filter ozone results, calculated as described in Section 5.1.1. More discussion of these topics is given in Section 5.3 where the 1975 UVS ozone results are tabulated.

It must be emphasized that for this 1975 series of flights the instrument was being operated in a non-standard mode, viewing essentially only Rayleigh scattered light. The data processing modifications described in this section apply only for that mode of operation.

5.2 Latitude Survey Flights - Fall 1976

A total of 15 Latitude Survey flights was made with the UVS on the NASA CV-990 in the Fall of 1976. Flight 1 on Oct. 26-27, 1976 was a test flight with only minimal amounts of UVS data being acquired. Flight 3 on Oct. 29-30, 1976 was for twilight conditions with the sun within about 5° of the horizon, hence no useful UVS data were acquired. Flight 4 on Oct. 30, 1976 was a sunrise flight and so also gave no useful UVS data. Thus no magnetic tape data for the UVS were collected for this flight. All other flights gave at least some valid UVS data, and these are presented in the following pages.

Each ozone measurement takes one complete cycle of the UVS filter wheel, or about 2 minutes. For each complete UVS cycle the necessary location and orientation data (latitude, pitch, etc.) averages, standard deviations, maxima, and minima are also calculated. For the ozone density,

used to correct the UVS measured ozone to total (above ground level) ozone, the average uses only data points with a signal voltage of less than 1.5 volts, to avoid calibration cycles. No additional filtering of the ozone density data has been carried out for the UVS data analysis, so some noise may still be present in some of the ozone densities listed. For such cases the listed total ozone will also be slightly in error, although a corrected value of the total ozone can be obtained by using the listed UVS measured ozone and the corrected ozone density to calculate a new total ozone by the method of Section 5.1.1. The ozone density voltages were converted to PPB by

$$\text{PPB}_{\text{O}_3} = (500V_{\text{O}_3} + 14) \times 1.12 \quad (5.11)$$

where V_{O_3} is the measured voltage. The value of PPB_{O_3} was converted to density by Eq. (5.9).

The measured UVS ozone values have been corrected for detailed solar spectrum structure and for the ozone absorption cross sections at about -50°C . The listed values are estimated to have a maximum systematic error of $\pm 5\%$, which applies only to unflagged values. Flagged values should be considered unreliable because of aircraft maneuvering or noisy data. The total ozone values are estimated to be almost as accurate as the measured ozone values. Under stable flight conditions both of these ozone values should have relative accuracies of ± 2 to 3% . Accuracy of the measurements is discussed in more detail in Section 5.4.

The data have the date (year-month-day), day of the year (from Jan. 1), and flight number heading each page. The tabulated data are explained in more detail below.

<u>Column</u>	<u>Heading</u>	<u>Explanation</u>
1	TBAR(GMT) HH MM:SS	Average time of the UVS measurement, in GMT hours-minutes-seconds.
2	LAT(DEG N)	Latitude - degrees North.
3	LONG(DEG E)	Longitude - degrees East.
4	PRESS ALT (KFT)	Pressure altitude, in kft (1000 ft).
5	SUN ANG (DEG)	Solar zenith angle, in degrees.
6	O ₃ PPB	The measured ozone density, in parts per billion (PPB) (negative = no data).
7	MEAS OZONE (ATM-CM)	The UVS measured ozone above the aircraft, in atm-cm (=Dobson units).

<u>Column</u>	<u>Heading</u>	<u>Explanation</u>
8	TOTAL OZONE (ATM-CM)	The total ozone above ground level, calculated as described in Section 5.1.1, in atm-cm.
9	QQQQQ	Five quality codes. All blank indicates valid UVS data. For meaning of non-blank codes, see below.
10-19	UV Fluxes	The measured UV fluxes at the wavelengths listed at the top of each column. The wavelengths are in nm, the fluxes in $W/(cm^2 \cdot nm)$. BB means broad-band filter ($\approx 10-30$ nm), and NB means narrow-band filter (2-3 nm).

The conditions which set the five quality codes (column 9) are as follows:

<u>Quality Code No.</u>	<u>Symbol</u>	<u>Set conditions (one or more will set the code)</u>
1	P	Standard deviation of aircraft pitch angle $> 2^\circ$. /Max-Min/ for pitch $> 5^\circ$. /Average pitch angle/ $> 5^\circ$.
2	R	Same as pitch conditions, but for the roll angle.
3	T	Standard deviation of the true heading $> 10^\circ$. /Max-Min/ for true heading $> 30^\circ$.
4	A	Standard deviation of the altitude > 1000 ft. /Max-Min/ for altitude > 3000 ft.
5	M	The average of the deviation of the 365.5 and 395.6 nm (371.3 and 401.9 for the 1975 flights) measured fluxes from the calculated fluxes is more than 10% of the running average. This generally indicates noisy data.
5	N	The standard deviation of at least one (four for the 1975 flights) of the average voltages for the dark current, 365.5, 395.6 (371.3 and 401.9 for 1975), and all filters contributing to the average ozone measurement, was > 0.1 volt. This indicates noise in the data, and overrides the M flag.

In the following pages UVS data are tabulated for altitudes greater than about 10 kft, and solar zenith angles of less than 65° . In Ref. 1.6 these cut-offs were about 30 kft and 75° , but for the lower altitudes of the present flight set it is felt that a 65° solar zenith angle cut-off is more appropriate. For some of the flights the UVS was turned off for $\theta_{\text{sun}} > 60^\circ$, so the 65° cut-off is more consistent with actual instrument operation. A few flights had data to $\theta_{\text{sun}} > 75^\circ$ for altitudes above 30 kft, and the data appear valid to at least $\theta_{\text{sun}} = 75^\circ$, but the cut-off has still been set at 65° for consistency. The tabulated data are presented in flight order below.

The following pages give the measured ozone, total ozone, and UV fluxes obtained from the UVS for the Fall 1976 Latitude Survey Flights of the NASA CV-990. Data are given for the flights listed below, in the order of the listing.

Table 5.1

List of UVS Flight Data for Fall 1976

Flight No.	Date (1976)	Minutes of Valid UVS data*	Page No. (s)
2	Oct. 28	40	22
5	Nov. 1	30	22
6	Nov. 3	175	22-24
7	Nov. 7-8	260	24-27
8	Nov. 8-9	300	28-30
9	Nov. 10	160	31-32
10	Nov. 11	70	33
11	Nov. 12-13	240	34-35
12	Nov. 14	120	36
13	Nov. 16	160	37-38
14	Nov. 17-18	215	39-40
15	Nov. 18	200	41-42

*Data for $\theta_{\text{sun}} < 65^\circ$, and altitude > 10 kft.

DATE= 761028 (YR-MO-DAY) DAY= 302 PLT NO= 2 NASA LATITUDE SURVEY - FALL 1976																			
THAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	OC000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	CZONE		(MEASURED	DOWNWARD	SOLAR	FLUX	IN (E-06)	W/(CM**2-NM)	WAVELENGTH	IN	NM)		
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	ND	NB	NB	NB	NB	BB	BB	BB	BB
2136:31	38.39	-122.95	17.62	56.95	37	0.230	0.237		58.4	5.60	0.000	0.009	1.25	5.11	21.06	42.04	49.6	64.0	
2138:43	38.61	-123.06	20.17	57.31	47	0.228	0.237		57.3	5.51	0.000	0.010	1.28	5.14	21.24	42.18	49.7	63.5	
2140:55	38.84	-123.17	22.77	57.68	43	0.226	0.236		57.8	5.58	0.000	0.010	1.27	5.21	21.59	42.44	49.1	62.9	
2143:7	39.08	-123.26	25.20	58.07	53	0.238	0.250	RT	62.4	5.94	0.000	0.006	1.13	5.18	22.09	45.04	53.7	70.4	
2145:19	39.34	-123.28	27.20	58.52	53	0.227	0.240		58.5	5.64	0.000	0.009	1.25	5.16	21.98	42.63	51.6	62.4	
2147:31	39.62	-123.21	29.10	58.99	56	0.217	0.230	M	55.8	5.74	0.000	0.010	1.20	5.14	21.36	42.45	47.6	55.3	
2149:43	39.92	-123.18	30.60	59.48	64	0.223	0.237		58.9	5.87	0.000	0.008	1.21	4.87	20.95	41.83	45.6	60.8	
2151:55	40.21	-123.15	31.05	59.96	61	0.222	0.236		57.7	5.69	0.000	0.008	1.12	4.76	20.11	38.86	47.2	61.3	
2154:7	40.49	-123.13	31.05	60.44	55	0.218	0.231	M	55.0	5.83	0.000	0.006	1.02	4.55	20.29	39.41	44.3	52.7	
2156:19	40.79	-123.10	31.06	60.93	49	0.233	0.248		49.9	4.77	0.000	0.005	0.89	4.00	19.49	37.80	44.9	56.8	
2158:31	41.08	-123.07	31.06	61.42	47	0.213	0.226	M	47.9	5.29	0.053	0.004	0.61	3.72	16.49	33.04	37.5	44.7	
2200:43	41.37	-123.04	31.05	61.91	47	0.224	0.238		45.7	4.45	0.000	0.004	0.80	3.76	17.68	35.67	41.9	54.2	
2202:54	41.66	-123.01	31.05	62.39	51	0.223	0.237		51.1	4.87	0.000	0.005	0.77	3.66	18.10	36.63	41.2	50.9	
2205:6	41.96	-122.98	31.06	62.89	53	0.225	0.239		54.5	4.90	0.000	0.004	0.68	3.53	17.63	35.24	41.9	53.5	
2207:19	42.25	-122.94	31.06	63.38	45	0.227	0.241		49.7	4.33	0.000	0.002	0.59	3.22	16.27	34.58	40.3	52.5	
2209:29	42.54	-122.94	31.05	63.85	41	0.222	0.236	R M	49.9	7.02	0.079	0.002	0.53	2.95	14.98	31.35	36.1	47.6	
2211:41	42.83	-123.01	31.06	64.29	37	0.232	0.247		51.0	4.03	0.000	0.000	0.47	2.90	15.78	34.37	40.5	52.4	
2213:53	43.11	-123.09	31.05	64.73	39	0.235	0.249		47.1	3.66	0.000	0.000	0.39	2.74	15.63	33.74	40.8	51.4	
2216:4	43.40	-123.16	31.05	65.16	33	0.243	0.258		48.0	3.40	0.000	0.000	0.35	2.44	15.00	33.03	40.0	51.1	

DATE= 751101 (YR-MO-DAY) DAY= 306 FLT NO= 5 NASA LATITUDE SURVEY - FALL 1976										374.1 312.8 289.2 294.5 303.9 308.4 318.8 326.1 365.5 395.6									
FBAI		LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)									
HH:MM:SS		(DEG)	(DEG)	ALT	ANG	PPB	OZONE		(ATM-CM)	(CM**2-NM) WAVELENGTH IN NM									
(GMT)		(N)	(E)	(KFT)	(DEG)				(ATM-CM)	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB
<hr/>																			
1849:52	19.24	-155.56	14.89	60.63	56	0.241	0.249			52.7	3.81	0.000	0.000	0.63	3.49	16.92	35.69	45.7	58.3
1843:4	19.42	-155.55	14.89	60.26	54	0.232	0.240	R		53.2	3.60	0.000	0.000	0.63	3.74	17.18	35.32	45.5	57.3
1845:16	19.61	-155.53	14.89	59.89	54	0.244	0.252			53.6	3.64	0.000	0.000	0.67	3.59	17.09	36.14	46.2	59.0
1847:27	19.80	-155.49	14.85	59.52	55	0.245	0.253			53.4	3.77	0.000	0.000	0.69	3.68	17.35	36.56	46.2	60.3
1849:39	19.98	-155.46	14.86	59.15	54	0.243	0.251			54.1	3.91	0.000	0.000	0.77	3.93	18.37	38.20	47.7	61.5
1851:51	20.15	-155.43	14.87	58.78	55	0.242	0.250			56.1	4.14	0.000	0.002	0.84	4.14	19.01	39.51	49.2	62.7
1854:3	20.27	-155.46	13.66	58.42	51	0.228	0.234	PRTAM		20.3	0.00	0.000	0.000	0.77	4.39	20.96	43.04	48.8	44.0
1856:14	20.12	-155.52	11.04	57.96	47	0.243	0.249			54.5	4.17	0.000	0.002	0.80	3.91	17.68	36.43	45.2	59.9
1858:26	19.94	-155.55	11.04	57.45	47	0.245	0.251			54.5	4.05	0.000	0.003	0.84	4.05	17.99	37.00	47.2	61.3
1900:38	19.76	-155.58	11.04	56.94	53	0.245	0.251			56.2	4.16	0.000	0.003	0.91	4.28	18.60	38.37	49.1	63.1
1902:50	19.58	-155.61	11.04	56.44	49	0.246	0.252			56.3	4.30	0.000	0.004	0.96	4.36	18.73	38.31	49.0	62.7
1905:1	19.40	-155.65	11.04	55.94	52	0.247	0.254			56.9	4.29	0.000	0.005	1.02	4.50	19.26	39.43	49.3	64.9
1907:13	19.22	-155.68	11.04	55.43	52	0.246	0.252			58.3	4.64	0.000	0.006	1.08	4.79	20.05	41.09	51.4	65.9
1909:25	19.05	-155.71	11.04	54.93	67	0.243	0.250			59.7	5.07	0.000	0.007	1.19	5.09	20.87	42.22	52.2	66.9

DATE= 751103 (YR-MO-DAY) DAY= 308 FLT NO= 6 NASA LATITUDE SURVEY - FALL 1976\																																					
FBAF		LAT		LONG		PRESS		SUN		03		MEAS		TOTAL		QCQQQ		374.1		312.8		289.2		294.5		303.9		308.4		318.8		326.1		365.5		395.6	
HHMM:SS		(DEG)		(DEG)		ALT		ANG		PPB		OZONE		OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)																					
(GMT)		(N)		(E)		(KFT)		(DEG)				(ATM-CM)				BB		BB		BB		BB		BB		BB		BB		BB		BB		BB			
2006:45		21.09		-157.90		6.14		47.94		-20		0.244		0.246		P A		65.5		5.94		0.000		0.022		2.02		7.06		25.11		49.75		60.4		77.3	
2008:58		20.90		-157.93		9.68		47.46		-20		0.237		0.241		R A		84.2		8.58		0.000		0.028		2.33		7.81		27.55		51.18		60.1		76.3	
2011:10		20.67		-157.91		13.75		46.93		-20		0.233		0.239		A		70.8		7.75		0.000		0.038		2.80		8.87		30.01		55.46		65.8		82.6	
2013:22		20.42		-157.89		17.03		46.39		22		0.230		0.237		A		74.8		8.88		0.000		0.045		3.11		9.75		32.04		58.17		67.3		84.1	
2015:34		20.16		-157.87		19.87		45.84		38		0.229		0.238				78.5		9.66		0.000		0.051		3.40		10.38		33.66		60.79		69.9		86.9	
2017:46		19.90		-157.85		22.54		45.28		31		0.229		0.239		R		82.6		10.39		0.000		0.059		3.75		11.15		28.85		64.39		75.7		92.0	

DATE=	751103	(YR-MO-DAY)	DAY=	308	FLT NO=	6	NASA LATITUDE SURVEY - FALL 1976												
TBAR	LAT	LONG	PRESS	SUN	03	MRAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(CM**2-NM)	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)										
(GMT)	N)	E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB	
2022:11	19.39	-158.02	26.75	44.32	35	0.224	0.236		83.0	11.49	0.095	0.073	4.17	12.04	37.38	66.05	74.2	91.4	
2024:23	19.12	-158.14	28.42	43.85	39	0.224	0.237		85.0	12.09	0.107	0.082	4.39	12.45	38.61	67.43	76.0	93.2	
2026:35	18.84	-158.26	30.16	43.37	41	0.222	0.236		87.9	12.82	0.113	0.090	4.70	13.30	39.95	70.19	78.0	95.7	
2028:47	18.56	-158.38	31.07	42.89	40	0.224	0.238		88.2	13.33	0.115	0.096	4.83	13.60	40.58	71.41	79.7	97.4	
2030:59	18.28	-158.50	31.06	42.42	54	0.222	0.236		92.2	13.91	0.130	0.103	5.07	13.95	41.87	73.54	80.9	98.7	
2033:11	18.00	-158.62	31.06	41.94	59	0.224	0.238		93.5	14.37	0.140	0.110	5.11	14.21	42.41	73.39	81.2	98.8	
2035:23	17.73	-158.74	31.07	41.47	42	0.225	0.239		94.1	14.07	0.129	0.113	5.19	14.45	42.54	73.93	83.2	101.1	
2037:35	17.45	-158.85	31.07	40.99	50	0.226	0.240		94.9	14.41	0.133	0.113	5.22	14.29	42.26	73.49	82.3	101.1	
2039:47	17.18	-158.97	31.06	40.52	59	0.226	0.241		93.8	14.36	0.136	0.118	5.30	14.36	42.48	73.46	82.7	100.9	
2041:59	16.90	-159.09	31.06	40.05	63	0.226	0.241		95.7	14.78	0.141	0.124	5.43	14.66	43.12	75.19	84.0	101.9	
2044:11	16.64	-159.20	31.07	39.58	63	0.228	0.243		97.2	15.13	0.145	0.126	5.52	15.00	43.76	76.22	85.4	104.3	
2046:23	16.37	-159.31	31.06	39.11	67	0.227	0.241		98.1	15.19	0.148	0.131	5.63	15.32	43.66	76.32	86.1	102.1	
2048:35	16.11	-159.42	31.06	38.65	66	0.258	0.275		90.8	13.21	0.142	0.102	4.37	14.02	44.07	76.50	79.4	103.6	
2050:46	15.85	-159.53	31.07	38.18	56	0.226	0.240		100.5	15.82	0.152	0.144	5.96	15.57	44.57	76.59	86.7	106.8	
2052:58	15.59	-159.64	31.07	37.72	49	0.211	0.224	M	102.5	17.62	0.239	0.126	5.50	13.89	40.16	57.10	58.0	90.4	
2055:10	15.33	-159.75	31.07	37.26	39	0.227	0.241		92.1	16.00	0.157	0.153	6.10	15.91	45.22	78.24	87.7	107.6	
2057:22	15.07	-159.86	31.07	36.80	33	0.293	0.311	M	100.3	17.40	0.206	0.158	3.42	9.66	34.75	60.02	75.8	95.1	
2059:34	14.81	-159.96	31.06	36.33	30	0.232	0.246		103.6	16.50	0.153	0.162	6.20	15.89	48.00	80.51	88.7	108.0	
2101:45	14.55	-160.06	31.07	35.87	26	0.227	0.241		104.1	17.10	0.166	0.171	6.52	16.82	47.59	80.82	90.0	109.3	
2103:57	14.28	-160.16	31.06	35.40	25	0.230	0.244		104.2	16.97	0.164	0.177	6.50	16.81	47.37	81.07	91.1	110.8	
2106:09	14.03	-160.26	31.07	34.95	24	0.229	0.243		104.1	16.72	0.158	0.182	6.62	17.10	47.80	82.33	92.0	111.4	
2108:21	13.76	-160.36	31.07	34.48	27	0.227	0.241		105.3	17.54	0.173	0.191	6.86	17.59	48.51	82.20	93.2	111.7	
2110:32	13.50	-160.46	31.07	34.02	30	0.228	0.242		105.8	18.00	0.179	0.198	6.89	17.63	48.37	82.38	93.7	112.2	
2112:44	13.23	-160.57	31.07	33.56	32	0.229	0.243		105.9	17.61	0.172	0.205	6.92	17.53	48.23	82.42	92.4	113.2	
2114:56	12.96	-160.67	31.07	33.10	34	0.228	0.242		105.3	17.47	0.172	0.213	7.11	18.17	49.26	83.70	93.5	112.9	
2117:07	12.69	-160.77	31.07	32.63	36	0.225	0.239		106.8	18.15	0.185	0.226	7.36	18.37	49.30	83.44	93.0	114.7	
2119:19	12.42	-160.87	31.07	32.17	38	0.228	0.242		106.2	18.49	0.184	0.230	7.35	18.34	49.71	83.93	94.2	115.8	
2121:31	12.16	-160.98	31.06	31.72	34	0.226	0.239		109.2	18.29	0.174	0.241	7.60	18.77	50.36	85.06	95.7	115.8	
2123:42	11.89	-161.08	31.07	31.26	34	0.219	0.233		109.1	19.09	0.199	0.253	7.95	19.38	51.51	87.74	90.3	115.1	
2125:54	11.62	-161.18	31.06	30.81	31	0.212	0.225	M	111.5	21.53	0.277	0.255	7.99	19.34	51.96	82.81	78.8	106.4	
2128:06	11.36	-161.28	31.07	30.36	28	0.214	0.227	M	90.6	22.68	0.159	0.195	6.28	15.35	39.13	62.31	66.4	82.5	
2130:17	11.09	-161.37	31.07	29.91	32	0.237	0.252	M	78.0	12.88	0.115	0.172	5.80	14.95	40.64	68.52	74.5	92.9	
2132:29	10.83	-161.47	31.06	29.47	32	0.234	0.249	M	94.4	17.60	0.183	0.193	6.36	15.89	43.99	74.13	78.3	100.3	
2134:41	10.62	-161.61	31.04	29.09	31	0.232	0.246	RT M	143.5	23.33	0.158	0.303	9.99	20.65	61.27	114.81	126.0	144.8	
2136:52	10.74	-161.71	30.14	29.02	37	0.193	0.204	RT M	85.0	17.68	0.226	0.161	5.05	11.08	26.06	36.29	49.2	55.6	
2139:04	11.05	-161.59	29.15	28.97	28	0.237	0.250	R M	65.8	12.05	0.097	0.134	4.75	12.10	32.80	57.64	60.6	76.3	
2141:16	11.32	-161.49	29.05	28.94	22	0.240	0.254	M	82.3	15.71	0.130	0.211	6.21	16.21	43.29	77.03	81.3	103.2	
2143:27	11.58	-161.38	29.06	28.91	23	0.229	0.242		81.1	16.46	0.132	0.268	8.20	20.62	54.67	91.88	98.7	121.8	
2145:39	11.83	-161.27	29.06	28.90	28	0.225	0.238		107.2	19.00	0.193	0.264	7.81	18.96	49.74	83.96	92.6	114.7	
2147:50	12.08	-161.16	29.07	28.90	30	0.226	0.239		112.8	19.82	0.215	0.274	7.88	19.32	50.94	85.41	93.4	115.5	
2150:02	12.34	-161.04	29.07	28.82	31	0.224	0.236		114.3	20.46	0.210	0.289	8.42	20.44	53.37	89.24	98.2	121.8	
2152:14	12.60	-160.93	29.06	28.97	31	0.226	0.239		115.6	20.29	0.200	0.278	8.29	20.39	53.53	90.67	99.1	121.8	
2154:25	12.87	-160.82	29.06	29.03	27	0.227	0.240		113.7	20.16	0.198	0.275	8.22	20.27	53.55	90.18	99.0	121.5	
2156:37	13.13	-160.70	29.06	29.12	26	0.227	0.239		116.0	20.31	0.207	0.276	8.33	20.42	53.89	90.51	99.7	123.9	
2158:49	13.41	-160.58	29.06	29.22	26	0.229	0.242		115.8	20.08	0.197	0.264	8.18	20.28	54.24	91.55	99.8	122.3	
2201:00	13.68	-160.46	29.06	29.34	28	0.228	0.241		115.9	20.59	0.209	0.265	8.21	20.25	54.02	90.89	99.7	123.5	
2203:12	13.96	-160.34	29.07	29.48	27	0.228	0.241		114.6	19.81	0.198	0.258	8.06	19.96	53.34	89.46	98.0	121.0	
2205:23	14.23	-160.22	29.06	29.64	24	0.229	0.242		112.9	19.74	0.197	0.250	7.89	19.44	52.09	88.07	97.1	121.1	
2207:35	14.50	-160.10	29.06	29.81	62	0.230	0.244		113.4	19.47	0.189	0.246	7.84	19.59	52.80	88.84	97.6	119.8	
2209:47	14.78	-159.98	29.06	30.00	44	0.215	0.228	M	112.2	19.59	0.197	0.244	7.82	19.39	50.18	86.51	96.2	87.5	
2211:58	15.05	-159.86	29.06	30.21	50	0.274	0.290		105.7	14.24	0.000	0.219	5.83	19.21	40.80	78.80	96.6	125.4	
2214:10	15.33	-159.74	29.06	30.44	54	0.253	0.268	R	88.5	10.72	0.000	0.201	6.90	12.25	37.88	50.89	98.6	109.0	
2216:21	15.61	-159.64	29.06	30.68	54	0.229	0.243		72.2	10.21	0.000	0.229	7.76	19.29	52.48	89.19	98.0	121.0	
2218:33	15.89	-159.54	29.06	30.93	58	0.226	0.240		116.9	15.10	0.000	0.232	7.80	19.37	52.07	88.42	95.6	120.2	
2220:45	16.17	-159.43	29.05	31.20	58	0.213	0.226	M	114.0	21.97	0.233	0.218	7.04	15.77	45.16	73.55	77.7	97.2	
2222:56	16.44	-159.32	29.06	31.48	57	0.232	0.246		105.4	18.21	0.183	0.226	7.39	19.11	51.84	87.20	95.5	119.4	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751103 (YR-MO-DAY)				DAY= 308		FLT NO= 6		NASA LATITUDE SURVEY - FALL 1976											
THAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM))										
(GMT)	N)	E)	(KET)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB	
2225: 8	16.71	-159.21	29.06	31.77	56	0.234	0.248		113.7	19.07	0.179	0.218	7.30	18.99	51.65	87.79	98.0	120.8	
2227: 20	16.98	-159.11	29.05	32.06	54	0.228	0.242		111.5	19.05	0.187	0.214	7.48	18.85	51.56	87.04	95.8	119.3	
2227: 31	17.24	-159.01	29.06	32.36	51	0.231	0.245		112.4	18.89	0.182	0.212	7.29	18.56	51.19	87.06	96.8	119.1	
2231: 43	17.49	-158.91	29.06	32.67	44	0.229	0.242		111.6	18.84	0.185	0.210	7.39	18.93	51.69	87.26	95.8	118.9	
2233: 54	17.74	-158.80	29.06	32.99	43	0.230	0.244		113.5	19.08	0.185	0.207	7.24	18.57	51.34	87.20	96.7	119.4	
2236: 6	17.99	-158.70	29.06	33.32	41	0.226	0.239		111.6	19.11	0.195	0.208	7.34	18.73	51.00	86.44	95.6	117.5	
2238: 18	18.25	-158.50	29.05	33.65	39	0.227	0.240		110.9	18.36	0.177	0.199	7.19	18.26	50.75	85.81	94.6	116.6	
2240: 29	18.49	-158.50	29.06	34.00	35	0.228	0.241		109.0	18.13	0.180	0.192	6.95	17.68	49.07	83.94	92.8	116.2	
2242: 41	18.73	-158.41	29.06	34.34	41	0.228	0.241		108.9	18.00	0.171	0.186	6.90	17.74	49.63	83.84	93.0	114.5	
2244: 52	18.97	-158.31	29.06	34.70	40	0.230	0.244		107.6	17.84	0.170	0.177	6.65	17.16	48.58	83.33	92.2	114.2	
2247: 4	19.22	-158.21	28.14	35.07	39	0.227	0.239	R	108.3	18.25	0.186	0.168	6.53	17.08	47.07	76.95	87.3	110.7	
2249: 16	19.48	-158.11	26.05	35.47	37	0.231	0.243	R	106.7	16.83	0.163	0.153	6.12	16.09	45.77	78.88	88.5	109.8	
2251: 27	19.73	-157.99	24.65	35.87	35	0.234	0.245	RT	102.1	16.14	0.159	0.145	6.00	14.13	45.08	80.79	87.1	110.1	
2253: 39	19.99	-157.98	22.82	36.26	41	0.232	0.243		104.4	16.36	0.161	0.137	5.70	15.28	44.30	75.92	85.9	108.3	
2255: 50	20.26	-157.97	19.11	36.66	47	0.236	0.245	A	101.7	15.05	0.128	0.117	5.23	14.27	42.71	74.31	84.6	106.0	
2258: 2	20.52	-157.97	14.39	37.06	50	0.236	0.243	P A	98.8	14.65	0.154	0.107	4.87	13.51	39.36	67.85	80.2	107.6	

DATE= 761107 (YR-MO-DAY)	DAY= 312	PLT NO= 7	NASA LATITUDE SURVEY - FALL 1976															
FBAR	LAT	LONG	PRBS	SUN	O3	MEAS	TOTAL	QOQOQ	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HMM4:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(MEASURED	DOWNWARD	SOLAR	FLUX	IN	(R-06)	W/(CM**2-MM)	WAVELENGTH	IN	MM)	
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATM-CN)		DB	DB	NB	NB	NB	NB	NB	NB	NB	DB	DB
2051:26	20.61	-158.02	15.94	42.54	67	0.245	0.253	PR A	81.9	11.18	0.079	0.054	3.12	9.73	30.85	59.01	66.7	85.5
2053:38	20.38	-158.02	19.31	42.08	43	0.191	0.199	R M	70.1	9.76	0.000	0.078	4.55	11.67	33.99	51.58	54.4	67.5
2055:50	20.14	-158.02	21.40	41.61	51	0.225	0.235	M	81.7	8.55	0.091	0.068	3.91	11.05	34.88	60.59	62.4	79.7
2058: 3	19.88	-158.01	24.21	41.12	53	0.245	0.257	R M	80.7	12.35	0.109	0.075	3.53	10.51	35.72	68.97	68.8	75.2
2100:15	19.61	-158.04	26.28	40.66	49	0.269	0.283	R	70.5	5.89	0.000	0.061	3.44	14.37	42.49	78.63	85.3	101.6
2102:27	19.36	-158.15	28.11	40.24	39	0.226	0.239		89.6	13.42	0.122	0.109	5.10	13.96	41.38	71.69	79.9	97.4
2104:39	19.12	-158.25	30.43	39.83	19	0.227	0.240		91.2	13.72	0.130	0.119	5.35	14.63	42.60	73.84	82.9	100.5
2106:51	18.88	-158.35	31.05	39.41	23	0.225	0.239		93.8	14.61	0.144	0.130	5.64	15.13	44.06	75.72	84.7	102.5
2107: 4	18.63	-158.45	31.04	39.00	21	0.227	0.241		93.3	14.18	0.142	0.133	5.67	15.32	44.60	76.19	84.4	103.0
2111:16	18.38	-158.54	31.04	38.59	22	0.224	0.238		96.2	15.16	0.147	0.139	5.88	15.64	44.87	77.51	85.1	103.0
2113:23	18.14	-158.64	31.04	38.18	24	0.223	0.236		96.4	15.35	0.165	0.145	5.98	15.69	44.77	77.14	84.2	102.6
2115:40	17.89	-158.74	31.04	37.77	26	0.226	0.240		98.3	15.94	0.167	0.153	5.97	15.82	44.72	76.26	85.8	106.5
2117:52	17.64	-158.85	31.04	37.37	25	0.225	0.239		98.1	15.60	0.155	0.153	5.99	15.60	44.19	76.92	85.2	103.3
2120: 4	17.39	-158.95	31.03	36.96	23	0.224	0.238		97.1	15.87	0.161	0.158	6.06	15.89	44.08	76.68	84.9	101.9
2122:16	17.14	-159.05	31.05	36.56	31	0.224	0.238		98.6	16.29	0.163	0.165	6.21	16.04	44.57	77.03	85.3	104.7
2124:27	16.89	-159.15	31.04	36.16	27	0.635	0.674	N	88.6	0.00	0.000	0.000	12.03	29.11	56.36	24.67	110.7	12.9
2126:34	16.64	-159.24	31.04	35.77	26	0.223	0.236		101.7	16.67	0.179	0.185	6.67	16.92	47.44	80.60	88.9	107.6
2128:46	16.39	-159.34	31.04	35.38	28	0.225	0.239		100.9	16.96	0.178	0.185	6.67	17.10	47.26	80.50	90.7	109.3
2130:58	16.14	-159.44	31.05	34.98	21	0.229	0.243		86.1	16.28	0.000	0.143	6.67	17.52	48.30	82.76	93.4	109.5
2133:10	15.88	-159.54	31.03	34.59	23	0.242	0.257		102.8	17.68	0.193	0.162	5.98	15.99	41.48	95.79	92.2	106.7
2135:21	15.63	-159.64	31.04	34.20	24	0.227	0.241	M	84.3	15.20	0.319	0.213	6.14	18.49	42.50	76.25	71.3	68.5
2137:33	15.38	-159.74	31.05	33.81	26	0.222	0.236		102.7	19.19	0.205	0.205	7.32	15.35	45.54	81.21	92.8	110.8
2139:45	15.13	-159.84	31.04	33.43	25	0.223	0.236		105.7	17.38	0.195	0.222	7.36	18.29	49.82	84.06	93.7	112.2
2141:57	14.88	-159.94	31.04	33.05	27	0.225	0.239		108.5	18.40	0.188	0.224	7.40	18.58	50.99	85.50	94.4	113.9
2144: 9	14.62	-160.03	31.04	32.68	29	0.223	0.236		105.6	18.74	0.210	0.225	7.25	18.02	49.60	79.70	87.3	108.9
2146:20	14.36	-160.13	31.05	32.30	30	0.219	0.233		104.2	14.41	0.153	0.212	7.72	18.30	49.77	85.85	94.3	113.7
2148:32	14.10	-160.23	31.04	31.92	31	0.226	0.240		110.1	18.39	0.189	0.235	7.44	18.81	49.08	84.14	96.1	113.0
2150:44	13.85	-160.33	31.04	31.55	29	0.228	0.242		110.8	19.33	0.204	0.246	7.57	17.63	51.38	85.88	95.4	116.1
2152:56	13.59	-160.43	31.04	31.19	26	0.999	1.060	M	110.4	18.10	0.199	0.245	7.86	19.62	51.36	20.63	96.2	106.9
2155: 8	13.33	-160.53	31.04	30.83	62	0.223	0.237		109.2	19.15	0.175	0.264	8.05	19.71	52.34	87.41	96.5	116.4
2157:19	13.07	-160.63	31.04	30.47	21	0.225	0.239		111.7	19.80	0.216	0.263	8.04	19.79	52.21	87.65	96.6	119.5
2159:31	12.82	-160.73	31.04	30.12	19	0.223	0.236		109.8	19.04	0.205	0.272	8.24	19.96	53.08	88.47	96.9	118.8
2201:43	12.56	-160.82	31.04	29.77	21	0.226	0.240		112.7	19.88	0.211	0.276	8.23	20.20	53.21	89.52	100.0	121.0
2203:55	12.31	-160.92	31.05	29.43	23	0.226	0.240		112.4	19.75	0.205	0.272	8.19	20.11	53.07	89.93	98.2	113.6
2206: 6	12.05	-161.02	31.04	29.10	27	0.224	0.238		112.0	19.82	0.217	0.286	8.39	20.19	53.47	89.81	98.2	119.7
2208:18	11.79	-161.11	31.04	28.76	30	0.227	0.241		111.3	20.02	0.209	0.283	8.27	20.29	53.24	88.90	98.1	120.1
2210:30	11.53	-161.21	31.04	28.43	30	0.224	0.237		112.8	19.89	0.214	0.292	8.53	20.42	53.65	90.01	99.2	120.4
2212:41	11.27	-161.31	31.04	28.11	30	0.223	0.236		115.7	19.58	0.239	0.297	8.39	20.53	54.32	88.23	95.6	109.4
2214:53	11.01	-161.41	31.05	27.79	26	0.240	0.255		99.0	16.60	0.230	0.272	7.60	19.30	53.49	91.43	97.4	116.2
2217: 5	10.75	-161.51	31.04	27.47	28	0.225	0.239		115.3	20.64	0.228	0.301	8.45	20.47	53.39	88.03	96.6	117.4
2219:17	10.49	-161.61	31.04	27.16	33	0.232	0.246		108.4	19.65	0.208	0.279	8.00	18.98	53.97	86.19	95.2	113.3
2221:28	10.22	-161.71	31.05	26.86	40	0.227	0.241	M	108.8	20.24	0.258	0.278	7.59	19.03	49.99	79.64	84.5	100.4
2223:40	9.95	-161.81	31.04	26.55	26	0.236	0.250		78.4	14.42	0.258	0.252	7.41	17.82	50.49	88.16	89.8	108.6
2225:52	9.68	-161.91	31.05	26.26	43	0.223	0.237		109.2	15.93	0.222	0.303	8.95	21.46	52.49	94.08	102.0	121.4
2228: 3	9.42	-162.00	31.04	25.98	35	0.251	0.267		105.8	15.66	0.182	0.233	6.80	18.73	47.92	86.40	91.4	109.1
2230:15	9.16	-162.10	31.04	25.71	37	0.205	0.217	M	110.1	24.65	0.320	0.304	8.74	21.58	47.11	57.77	73.1	88.0
2232:27	8.92	-162.20	31.05	25.44	30	0.226	0.240		110.7	14.75	0.199	0.293	8.38	20.45	53.17	87.66	93.6	108.2
2234:38	8.62	-162.30	31.04	25.17	25	0.216	0.229		97.5	19.81	0.257	0.280	8.47	19.56	48.33	84.77	90.2	105.9
2236:50	8.35	-162.40	31.05	24.91	29	0.220	0.234		105.6	19.11	0.206	0.291	8.64	20.92	55.04	94.04	94.5	95.5
2239: 2	8.07	-162.50	31.05	24.65	29	0.220	0.233	M	119.3	21.55	0.266	0.269	7.59	15.69	44.68	58.70	80.7	97.1
2241:13	7.80	-162.60	31.04	24.40	26	0.212	0.257	M	86.9	12.41	0.106	0.194	5.79	14.38	40.51	59.66	77.1	76.0
2243:25	7.53	-162.70	31.04	24.17	31	0.228	0.242		71.2	11.48	0.101	0.277	7.95	19.44	47.68	82.50	89.1	106.9
2245:37	7.26	-162.80	31.05	23.95	21	0.226	0.240		109.3	18.72	0.210	0.312	8.32	19.86	51.39	82.84	88.4	111.4
2247:48	6.99	-162.90	31.05	23.73	34	0.211	0.224	M	79.3	22.36	0.227	0.216	7.05	19.28	53.39	88.62	47.3	53.1
2250: 0	6.72	-163.00	31.04	23.53	122	0.000	0.000	N	0.0	0.08	0.474	5.525	30.27	40.74	20.45	20.50	0.0	0.0
2254: 7	6.21	-163.18	31.04	23.17	-20	0.290	0.307	M	59.4	8.42	0.000	0.185	4.80	12.20	38.87	77.83	82.0	93.9

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE=	751137	(YR-MO-DAY)	DAY=	312	FLT NO=	7	NASA LATITUDE SURVEY - FALL 1976													
FBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	269.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6		
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED	DOWNWARD	SOLAR	FLUX	IN	(E-06)	W/(CM**2-NM)	WAVELENGTH	IN	NM)		
(GMT)	N)	E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	NR	NR	NR	NR	NR	NR	NR	NR		
2256:18	5.94	-163.28	31.05	22.99	-20	0.229	0.243		101.9	19.88	0.233	0.320	7.89	19.16	48.82	79.84	84.9	103.1		
2258:30	5.66	-163.38	31.05	22.82	181	0.219	0.237		93.0	16.85	0.202	0.343	8.94	20.71	51.66	87.76	91.4	111.2		
2300:42	5.39	-163.48	31.05	22.66	-20	0.247	0.262		104.7	19.27	0.191	0.349	8.08	20.69	55.69	90.96	99.7	120.1		
2302:53	5.11	-163.58	31.04	22.51	19	0.225	0.238		117.7	21.78	0.234	0.383	9.57	22.26	56.59	93.92	102.6	124.0		
2105:5	4.84	-163.68	31.05	22.37	19	0.221	0.234		118.9	22.04	0.240	0.403	9.26	22.99	58.00	95.51	104.1	123.3		
2307:17	4.56	-163.78	31.29	22.24	19	0.219	0.232		120.4	22.60	0.256	0.406	9.97	22.62	56.34	93.17	102.5	124.2		
2309:28	4.28	-163.88	33.00	22.12	19	0.225	0.239		119.0	22.33	0.236	0.413	9.94	23.16	58.04	96.73	104.9	126.9		
2311:40	4.01	-163.98	34.53	22.02	-20	0.221	0.236		121.7	22.79	0.254	0.432	10.41	23.91	57.75	98.42	107.2	129.3		
2313:52	3.73	-164.08	35.01	21.92	-20	0.221	0.236		124.4	24.00	0.273	0.442	10.53	24.10	59.97	97.74	106.9	128.9		
2316:3	3.46	-164.18	35.02	21.85	136	0.223	0.241		124.7	23.59	0.257	0.442	10.50	24.11	60.15	100.04	108.9	131.2		
2318:15	3.18	-164.27	35.03	21.78	420	0.223	0.252		124.2	23.28	0.260	0.443	10.56	24.40	60.85	100.31	109.2	130.9		
2320:26	2.90	-164.38	35.02	21.72	18	0.221	0.237		125.0	23.85	0.269	0.447	10.67	24.33	60.56	99.68	109.0	131.4		
2322:38	2.62	-164.48	35.03	21.67	25	0.224	0.239		125.4	23.80	0.261	0.443	10.51	24.02	60.18	99.79	109.7	131.8		
2324:50	2.34	-164.58	35.00	21.64	20	0.225	0.241		124.8	23.50	0.255	0.442	10.51	24.41	61.04	100.99	109.8	131.3		
2327:1	2.07	-164.67	35.01	21.62	20	0.222	0.238		124.3	23.83	0.265	0.444	10.65	24.48	60.63	100.35	108.8	131.6		
2329:13	1.80	-164.77	35.02	21.62	36	0.226	0.242		124.2	23.57	0.256	0.434	10.27	23.82	59.53	98.60	108.0	130.8		
2331:24	1.53	-164.87	35.02	21.63	159	0.225	0.243		121.9	22.99	0.248	0.428	10.27	23.88	59.48	98.62	106.9	128.9		
2333:36	1.26	-164.97	35.02	21.65	19	0.223	0.238		121.3	23.24	0.259	0.428	10.29	23.57	58.69	96.86	105.7	127.7		
2335:47	0.99	-165.07	35.00	21.68	20	0.225	0.241		122.4	23.09	0.250	0.421	10.11	23.35	58.56	97.55	106.3	128.3		
2337:59	0.72	-165.16	35.02	21.73	19	0.225	0.240		123.9	23.46	0.254	0.435	10.46	24.31	60.87	100.03	108.7	130.4		
2340:10	0.44	-165.26	35.02	21.79	21	0.226	0.242		127.7	24.38	0.264	0.442	10.53	24.43	61.06	102.16	111.5	135.0		
2342:22	0.16	-165.36	35.02	21.85	22	0.223	0.239		125.2	23.78	0.257	0.437	10.53	24.31	60.97	99.89	108.1	130.2		
2344:33	-0.11	-165.46	34.96	21.93	24	0.227	0.243	P	119.9	25.12	0.247	0.431	10.07	23.29	59.18	98.26	107.6	129.4		
2346:45	-0.38	-165.56	35.02	22.03	23	0.223	0.239		122.8	22.98	0.258	0.432	10.35	23.89	60.07	98.21	106.8	127.8		
2348:57	-0.66	-165.66	35.03	22.12	20	0.221	0.236		126.0	23.94	0.273	0.444	10.65	24.20	60.34	99.44	109.3	131.2		
2351:8	-0.94	-165.76	35.02	22.24	21	0.224	0.239		125.9	23.58	0.263	0.442	10.47	24.14	60.45	100.74	109.4	132.1		
2353:20	-1.21	-165.86	35.03	22.36	21	0.221	0.237		124.6	23.64	0.266	0.442	10.61	24.54	60.78	100.41	108.5	131.2		
2355:31	-1.49	-165.96	35.02	22.50	21	0.223	0.238		124.0	23.55	0.266	0.435	10.36	23.74	59.69	98.06	107.4	130.3		
2357:43	-1.77	-166.06	35.03	22.64	20	0.223	0.239		120.9	22.63	0.250	0.415	10.12	23.46	58.82	97.22	105.4	127.2		
2359:55	-2.04	-166.16	35.02	22.79	20	0.221	0.236		120.6	23.02	0.257	0.424	10.19	23.29	58.02	95.89	105.0	126.9		
0002:6	-2.32	-166.26	35.01	22.96	20	0.223	0.238		121.3	22.88	0.256	0.414	9.97	22.97	57.99	95.54	103.8	125.3		
0004:18	-2.58	-166.35	35.02	23.14	20	0.220	0.236		120.8	22.98	0.263	0.422	10.25	23.57	58.96	96.70	105.0	126.8		
0006:28	-2.85	-166.45	35.02	23.34	20	0.222	0.238		125.3	23.55	0.260	0.423	10.29	23.57	59.59	98.59	108.3	131.0		
0008:41	-3.11	-166.54	35.02	23.55	24	0.223	0.239		122.5	22.87	0.254	0.414	10.15	23.65	59.47	98.52	106.7	128.5		
0010:52	-3.38	-166.64	35.02	23.76	26	0.223	0.238		121.6	22.93	0.258	0.404	10.00	23.06	58.21	96.67	105.7	128.5		
0013:4	-3.64	-166.74	35.02	23.98	29	0.225	0.241		121.6	22.70	0.242	0.393	9.83	23.09	58.39	97.24	105.9	127.0		
0015:15	-3.91	-166.84	35.03	24.21	30	0.222	0.237		123.4	23.43	0.264	0.402	10.15	23.58	59.31	97.98	106.6	128.9		
0017:27	-4.18	-166.93	35.02	24.44	32	0.224	0.240		122.4	22.60	0.240	0.385	9.79	22.76	58.58	96.63	105.7	125.8		
0019:38	-4.45	-167.03	35.02	24.69	34	0.223	0.238		117.2	22.03	0.246	0.376	9.57	22.31	56.75	93.62	101.6	123.1		
0021:50	-4.72	-167.13	35.03	24.94	31	0.226	0.241		119.4	22.04	0.240	0.367	9.44	22.12	56.67	94.49	103.5	125.4		
0024:2	-4.98	-167.23	35.02	25.20	40	0.222	0.238		118.3	21.77	0.241	0.362	9.54	22.38	57.02	94.99	102.4	121.7		
0026:13	-5.25	-167.33	35.02	25.46	40	0.225	0.241		117.0	21.75	0.239	0.349	9.23	21.65	55.47	93.16	102.3	123.4		
0028:25	-5.52	-167.42	35.02	25.73	42	0.225	0.241		114.6	20.98	0.234	0.339	9.09	21.47	55.47	91.91	100.0	120.4		
0030:36	-5.79	-167.52	35.02	26.01	50	0.227	0.243		117.3	21.44	0.236	0.336	9.08	21.41	55.84	92.91	102.3	123.4		
0032:48	-6.06	-167.62	35.03	26.29	29	0.227	0.243		118.4	21.25	0.234	0.330	9.08	21.75	56.39	93.94	101.9	123.2		
0034:59	-6.33	-167.72	35.02	26.58	26	0.226	0.242		116.0	21.29	0.238	0.324	8.92	21.12	54.77	91.68	100.2	122.4		
0037:11	-6.60	-167.82	35.02	26.87	31	0.228	0.244		114.4	20.85	0.222	0.312	8.71	20.87	54.71	91.14	99.5	119.7		
0039:22	-6.88	-167.92	35.02	27.17	39	0.228	0.244		117.2	21.12	0.232	0.310	8.81	21.11	55.19	92.74	100.9	123.1		
0041:34	-7.15	-168.02	35.02	27.48	60	0.231	0.248		119.3	21.12	0.224	0.300	8.72	21.37	55.91	94.82	103.5	125.1		
0043:45	-7.42	-168.12	35.02	27.79	59	0.229	0.245		116.5	20.93	0.225	0.288	8.65	21.00	55.60	92.66	100.9	121.2		
0045:57	-7.69	-168.22	35.02	28.11	39	0.227	0.243	M	115.9	21.16	0.236	0.274	7.91	20.03	49.80	89.53	97.3	98.6		
0048:9	-7.96	-168.32	35.02	28.43	52	0.218	0.233	M	101.7	17.98	0.218	0.238	7.90	18.02	47.74	80.65	86.8	103.4		
0050:20	-8.23	-168.42	35.02	28.75	51	0.234	0.250		100.5	18.31	0.194	0.263	8.31	20.76	56.03	93.56	101.1	122.7		
0052:32	-8.51	-168.52	35.02	29.08	42	0.229	0.245		114.5	20.48	0.231	0.275	8.33	20.42	53.96	90.31	98.8	120.5		
0054:43	-8.77	-168.62	35.03	29.42	36	0.232	0.248		113.7	19.64	0.218	0.264	8.04	19.84	53.24	90.17	99.8	120.0		
0056:55	-9.05	-168.72	35.03	29.75	24	0.229	0.245		115.1	20.36	0.225	0.266	8.26	20.40	54.41	91.46	99.3	120.5		

DATE= 761108 (YR-MO-DAY)		DAY= 313		FLT NO= 7		NASA LATITUDE SURVEY - FALL 1976																
PDAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6				
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)										WAVELENGTH IN NM)			
(GMT)	N)	E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	NR	NR				
0059.6	-9.33	-168.82	35.03	30.09	23	0.231	0.247		117.2	20.72	0.222	0.256	8.18	20.22	54.19	93.00	101.1	123.0				
0101:18	-9.60	-168.92	35.03	30.43	37	0.231	0.248		115.2	20.02	0.217	0.248	8.05	20.06	54.42	91.93	99.3	121.6				
0103:30	-9.87	-169.02	35.01	30.78	47	0.232	0.248		114.4	20.10	0.226	0.236	7.78	19.40	53.00	89.39	97.3	119.1				
0105.41	-10.14	-169.12	35.02	31.14	79	0.235	0.252		112.3	19.28	0.197	0.223	7.48	18.96	51.89	88.73	98.0	118.4				
0107.53	-10.41	-169.22	35.03	31.49	64	0.234	0.251		112.0	19.14	0.208	0.215	7.47	18.98	52.30	89.01	96.0	117.0				
0110: 4	-10.68	-169.32	35.03	31.85	84	0.233	0.251		111.0	18.88	0.206	0.209	7.24	18.32	50.08	86.14	94.3	116.0				

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE=	761108	(YR-MO-DAY)	DAY=	313	PLT NO=	8	NASA LATITUDE SURVEY - FALL 1976														
TIME	LAT	LONG	PRESS	SUN	ANG	PPB	MXAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6		
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB		OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (R-06) W/(CM**2-NM) WAVELENGTH IN NM)											
(ZMT)	(N)	(E)	(KFT)	(DEG)			(ATH-CM)			BB	BB	NB	NB	NB	NB	NB	NB	RR	RR		
2204:24	-17.88	-175.20	31.03	19.17	23		0.232	0.247		132.2	25.57	0.275	0.355	9.93	21.32	57.95	102.73	108.2	136.8		
2206:35	-18.06	-175.42	31.04	18.86	24		0.248	0.263		132.9	21.04	0.242	0.345	9.35	23.56	60.25	102.94	113.0	133.5		
2208:47	-18.23	-175.65	31.05	18.56	24		0.241	0.255		126.9	23.38	0.228	0.341	9.59	22.18	61.22	101.40	109.3	132.0		
2210:59	-18.40	-175.87	31.05	18.26	28		0.241	0.256		114.9	19.68	0.227	0.320	9.46	22.92	57.92	100.52	108.5	132.3		
2213:11	-18.57	-176.09	31.05	17.95	29		0.244	0.259		129.3	23.32	0.234	0.351	9.19	21.07	51.87	94.39	111.9	134.9		
2215:22	-18.74	-176.32	31.06	17.66	27		0.222	0.236	M	129.6	27.06	0.370	0.347	10.25	24.21	63.98	82.77	86.1	121.6		
2217:34	-18.91	-176.55	31.05	17.36	16		0.249	0.264		131.6	22.72	0.238	0.343	9.53	23.77	61.34	102.34	114.7	136.8		
2219:46	-19.08	-176.78	31.05	17.07	16		0.244	0.259		128.0	23.78	0.243	0.338	9.77	22.77	61.80	102.79	111.2	140.4		
2221:57	-19.25	-177.00	31.05	16.79	18		0.246	0.260		131.1	23.08	0.267	0.333	9.75	23.40	61.14	103.96	111.1	142.2		
2224: 9	-19.42	-177.23	31.05	16.50	22		0.246	0.261		134.9	23.46	0.267	0.343	9.97	24.42	62.18	105.72	114.7	141.9		
2226:21	-19.58	-177.45	31.04	16.21	18		0.249	0.264		134.5	23.35	0.258	0.347	9.84	24.51	62.33	103.38	115.2	141.3		
2228:32	-19.74	-177.66	31.04	15.92	20		0.249	0.264		133.3	23.66	0.250	0.352	9.79	24.33	62.45	100.66	115.5	137.7		
2230:44	-19.90	-177.88	31.06	15.64	19		0.247	0.262		132.9	24.34	0.241	0.362	10.01	23.95	63.36	99.84	116.2	140.5		
2232:56	-20.06	-178.10	31.05	15.36	19		0.245	0.260		131.8	24.90	0.251	0.361	10.13	23.82	63.99	100.05	115.1	140.6		
2235: 7	-20.22	-178.32	31.06	15.08	56		0.244	0.259		129.2	24.03	0.255	0.351	10.03	23.17	62.31	99.89	112.6	139.7		
2237:11	-20.39	-178.54	31.05	14.81	18		0.244	0.259		127.0	23.50	0.252	0.341	9.90	22.83	61.84	98.63	110.9	138.8		
2239:11	-20.55	-178.77	31.05	14.54	21		0.245	0.260		130.0	23.94	0.254	0.351	10.24	23.73	64.21	100.57	115.3	142.4		
2241:42	-20.71	-178.99	31.05	14.29	21		0.243	0.258		134.8	24.71	0.264	0.364	10.72	25.01	66.64	101.21	119.3	145.2		
2243:54	-20.87	-179.21	31.05	14.03	20		0.244	0.259		132.9	25.42	0.264	0.362	10.41	24.25	65.40	98.99	116.5	141.6		
2246: 6	-21.03	-179.44	31.05	13.78	22		0.246	0.261		129.2	24.68	0.248	0.350	10.07	23.67	63.69	96.90	113.8	138.3		
2248:17	-21.19	-179.66	31.05	13.53	23		0.249	0.264		130.0	24.25	0.245	0.344	9.98	23.64	63.94	97.26	114.8	140.0		
2250:29	-21.35	-179.88	31.06	13.28	23		0.248	0.263		131.5	24.58	0.255	0.349	10.12	23.68	64.21	98.70	115.4	142.1		
2252:41	-21.50	-180.10	31.05	13.04	26		0.250	0.266		129.6	24.11	0.234	0.346	9.89	23.57	63.35	97.33	115.2	138.5		
2254:52	-21.66	-179.68	31.06	12.80	24		0.253	0.268		129.6	23.54	0.238	0.334	9.66	23.04	63.00	98.12	113.3	137.0		
2257: 4	-21.81	-179.46	31.05	12.57	25		0.247	0.262		129.3	23.75	0.263	0.328	10.00	22.86	62.06	101.36	111.1	141.0		
2259:16	-21.97	-179.24	31.04	12.35	28		0.261	0.277		133.5	21.94	0.222	0.321	9.53	24.29	62.31	101.97	118.9	143.6		
2301:27	-22.12	-179.02	31.05	12.13	29		0.256	0.272		134.4	24.32	0.243	0.338	9.81	24.51	63.99	99.49	117.6	140.7		
2303:39	-22.27	-178.80	31.05	11.91	24		0.258	0.274		133.6	23.90	0.248	0.331	9.53	24.01	62.10	100.42	112.7	142.9		
2305:50	-22.42	-178.58	31.06	11.71	27		0.255	0.271		134.9	24.01	0.248	0.323	9.94	23.61	64.67	98.90	117.7	143.9		
2308: 2	-22.58	-178.35	31.05	11.51	51		0.257	0.273		134.5	24.80	0.252	0.326	9.89	23.54	64.07	99.40	119.4	145.0		
2310:14	-22.73	-178.13	31.05	11.32	29		0.258	0.273		128.9	22.32	0.230	0.320	9.69	23.45	64.00	97.85	117.5	140.6		
2312:25	-22.88	-177.91	31.05	11.13	71		0.255	0.271		134.9	23.71	0.256	0.311	9.52	23.22	59.29	99.58	113.8	140.8		
2314:37	-23.02	-177.69	31.05	10.95	29		0.273	0.290		134.3	23.15	0.269	0.293	8.60	22.79	61.35	100.42	111.5	139.6		
2316:48	-23.17	-177.48	31.05	10.78	31		0.258	0.274		138.7	23.47	0.274	0.308	9.78	23.88	63.31	103.12	116.0	146.5		
2319: 0	-23.32	-177.25	31.06	10.62	34		0.258	0.274		129.5	22.74	0.259	0.300	9.64	23.28	62.48	100.96	114.8	145.2		
2321:12	-23.47	-177.03	31.87	10.47	34		0.259	0.275		133.5	22.90	0.241	0.299	9.83	23.55	64.34	99.45	117.3	146.5		
2323:23	-23.61	-176.82	34.16	10.32	43		0.255	0.273		135.5	24.54	0.263	0.324	10.15	23.97	65.43	99.95	117.2	143.5		
2325:35	-23.76	-176.60	31.96	10.19	52		0.258	0.275		129.4	23.24	0.239	0.302	9.42	22.51	62.59	97.84	114.8	133.1		
2327:46	-23.91	-176.36	31.00	10.08	74		0.265	0.282		130.3	23.13	0.219	0.299	9.13	22.92	61.69	97.23	116.1	137.7		
2329:58	-24.07	-176.13	31.05	9.98	90		0.266	0.284		131.1	22.68	0.233	0.289	8.90	22.90	59.64	97.26	112.7	137.2		
2332:10	-24.21	-175.91	31.05	9.88	93		0.265	0.282		133.5	22.28	0.248	0.279	8.99	22.59	59.93	98.59	111.0	140.1		
2334:21	-24.36	-175.68	31.05	9.79	96		0.264	0.281		135.4	22.60	0.259	0.278	9.29	22.83	62.00	100.10	114.3	143.7		
2336:33	-24.50	-175.46	31.05	9.71	91		0.264	0.281		131.2	22.47	0.237	0.274	9.21	22.12	61.95	97.45	114.9	140.0		
2338:44	-24.65	-175.23	31.05	9.64	91		0.268	0.286		127.9	22.60	0.213	0.274	8.87	22.12	60.79	95.38	115.0	136.2		
2340:56	-24.79	-175.01	31.05	9.59	92		0.269	0.287		129.8	22.51	0.215	0.278	8.74	22.44	59.88	96.75	113.8	136.3		
2343: 7	-24.94	-174.78	31.06	9.55	111		0.268	0.286		135.9	22.60	0.250	0.276	8.96	22.95	60.39	100.81	112.9	141.7		
2345:19	-25.08	-174.56	31.05	9.51	122		0.265	0.283		132.7	21.90	0.254	0.272	9.09	22.39	60.79	98.91	112.3	141.2		
2347:30	-25.23	-174.33	31.05	9.49	84		0.263	0.280		129.2	22.19	0.238	0.270	9.07	21.63	60.81	96.01	111.9	136.8		
2349:42	-25.37	-174.10	31.05	9.49	88		0.265	0.283		130.6	23.28	0.233	0.280	9.19	22.36	62.42	97.37	115.1	139.6		
2351:54	-25.52	-173.86	31.05	9.50	93		0.266	0.284		130.3	23.10	0.226	0.283	9.07	22.46	61.69	97.11	115.7	137.0		
2354: 5	-25.67	-173.63	31.05	9.52	88		0.268	0.286		129.8	22.54	0.217	0.283	8.83	22.39	60.64	95.91	114.2	136.5		
2356:17	-25.81	-173.40	31.05	9.55	84		0.264	0.281		126.2	22.77	0.231	0.276	8.99	21.72	60.66	94.84	111.1	136.0		
2358:29	-25.95	-173.17	31.05	9.59	84		0.264	0.281		127.3	22.63	0.231	0.278	9.02	21.80	61.01	95.29	112.3	136.3		
0000:40	</																				

DATE=	761109	(YR-MO-DAY)	DAY=	314	FLT NO=	8	NASA LATITUDE SURVEY - FALL 1976																									
FBAR	LAT	LONG	PRESS	SUN	03	NEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6														
HHMM-SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-MM))												WAVELENGTH IN MM											
(GMT)	(N)	(E)	(KFT)	(DEG)			(ATM-CM)		BB	BB	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	BB	BB	NR	NR	NR	NR	BB	BB	NR	NR	NR	NR
0007:15	-26.52	172.23	31.05	9.85	84	0.269	0.287		127.6	21.90	0.216	0.272	8.54	21.97	58.92	95.50	111.7	132.2														
0009:27	-26.67	171.99	31.27	9.95	85	0.269	0.287		129.3	22.10	0.220	0.274	8.67	22.28	59.47	96.91	113.2	134.2														
0011:38	-26.81	171.76	32.04	10.05	82	0.269	0.287		128.7	21.97	0.225	0.274	8.65	22.30	59.21	96.23	111.7	132.8														
0013:50	-26.95	171.52	31.29	10.16	83	0.271	0.289		128.1	21.63	0.222	0.261	8.40	21.80	58.19	96.17	110.5	132.4														
0016:2	-27.10	171.27	31.05	10.29	68	0.271	0.289		128.2	21.62	0.225	0.256	8.38	21.89	58.07	96.76	110.0	132.9														
0018:13	-27.24	171.03	31.05	10.41	81	0.272	0.290		130.3	21.61	0.225	0.254	8.38	22.02	58.44	97.43	111.3	133.4														
0020:25	-27.38	170.79	31.06	10.55	86	0.272	0.291		128.5	21.37	0.218	0.252	8.29	21.68	58.14	96.49	110.5	132.1														
0022:36	-27.52	170.55	31.06	10.69	85	0.274	0.292		126.6	20.99	0.217	0.242	8.14	21.35	57.51	95.66	109.9	131.0														
0024:48	-27.66	170.31	31.18	10.83	85	0.275	0.294		128.3	21.30	0.211	0.241	8.19	21.41	58.61	96.23	112.5	132.8														
0026:59	-27.79	170.08	31.75	10.99	81	0.274	0.292		128.7	21.82	0.207	0.244	8.39	21.40	59.89	96.28	113.6	134.9														
0029:11	-27.93	169.84	32.19	11.15	83	0.272	0.291		126.4	22.05	0.216	0.241	8.47	21.21	60.02	95.48	111.9	135.4														
0031:22	-28.06	169.60	33.01	11.31	80	0.272	0.291		125.2	21.89	0.220	0.240	8.46	20.94	59.71	95.10	111.1	134.5														
0033:34	-28.20	169.36	33.87	11.49	84	0.272	0.291		127.0	22.34	0.228	0.243	8.63	21.34	60.96	96.97	112.3	137.5														
0035:45	-28.33	169.13	34.98	11.66	86	0.268	0.287		131.0	22.95	0.252	0.252	9.02	22.05	61.67	100.10	112.8	141.8														
0037:57	-28.46	168.90	35.03	11.84	82	0.268	0.288		131.7	22.23	0.261	0.246	8.83	22.16	60.22	100.52	111.3	140.3														
0040:8	-28.59	168.67	35.03	12.03	79	0.272	0.292		111.2	21.54	0.250	0.242	8.46	21.87	58.66	99.08	110.9	135.4														
0042:20	-28.72	168.43	35.03	12.21	77	0.274	0.294		131.6	21.70	0.236	0.243	8.30	21.96	58.66	97.72	111.8	132.6														
0044:32	-28.85	168.19	35.04	12.41	79	0.276	0.296		129.3	21.86	0.216	0.241	8.28	21.26	59.45	96.29	113.4	133.9														
0046:43	-28.98	167.96	35.03	12.61	79	0.271	0.291	R	123.6	21.86	0.225	0.224	8.42	21.51	59.69	95.13	107.7	133.3														
0048:55	-29.08	167.72	35.03	12.78	126	0.272	0.293		125.5	21.01	0.250	0.217	8.16	20.71	57.10	97.89	106.9	132.6														
0051:6	-29.18	167.47	35.03	12.96	77	0.278	0.298		128.3	20.48	0.225	0.223	7.91	21.13	57.27	96.51	110.1	130.1														
0053:18	-29.28	167.22	35.04	13.14	82	0.279	0.300		127.8	21.55	0.216	0.224	8.03	20.71	59.54	96.53	112.0	133.5														
0055:29	-29.38	166.97	35.03	13.32	83	0.477	0.512	N	141.5	0.00	0.000	1.438	37.22	44.94	80.96	38.35	153.3	0.7														
0057:35	-29.48	166.74	35.03	13.51	82	0.275	0.295		122.9	21.04	0.224	0.211	8.05	20.05	57.81	96.44	109.1	131.9														
0059:47	-29.58	166.49	35.03	13.70	83	0.273	0.293		125.5	21.56	0.241	0.213	8.19	20.64	58.29	100.06	108.2	135.4														
0101:59	-29.68	166.25	35.03	13.89	82	0.279	0.300		131.7	20.99	0.231	0.221	7.95	21.58	58.27	100.51	112.3	133.3														
0104:10	-29.78	166.00	35.03	14.09	80	0.279	0.300		127.2	21.79	0.213	0.218	7.98	20.52	59.52	98.20	110.6	134.9														
0106:21	-29.88	165.75	35.03	14.30	85	0.273	0.294		125.6	21.24	0.239	0.203	8.03	20.40	57.51	100.11	107.4	133.2														
0108:33	-29.98	165.51	35.03	14.50	89	0.280	0.301		130.6	20.76	0.227	0.210	7.75	21.05	57.46	99.95	110.4	131.5														
0110:44	-30.08	165.26	35.03	14.71	87	0.280	0.300		130.4	22.17	0.219	0.214	7.97	20.89	59.85	99.55	112.4	135.2														
0112:56	-30.19	165.02	35.03	14.93	72	0.276	0.296		123.9	21.58	0.224	0.204	7.95	20.06	58.29	99.62	107.5	134.2														
0115:7	-30.29	164.79	35.03	15.15	70	0.275	0.295		121.3	19.96	0.235	0.200	7.62	20.26	55.35	98.02	105.7	126.8														
0117:19	-30.39	164.55	35.04	15.37	68	0.280	0.300		128.0	20.94	0.214	0.212	7.78	20.57	58.38	97.94	111.4	133.4														
0119:31	-30.50	164.31	35.04	15.59	70	0.273	0.293		128.8	21.93	0.254	0.209	8.25	21.02	59.50	105.32	110.8	137.8														
0121:42	-30.61	164.07	35.03	15.82	58	0.279	0.292		131.4	21.17	0.221	0.217	7.88	21.16	59.32	100.60	113.8	133.3														
0123:54	-30.72	163.82	35.03	16.05	66	0.273	0.293		126.2	22.13	0.240	0.205	8.15	20.26	59.09	102.24	108.8	137.8														
0126:5	-30.83	163.58	35.03	16.28	67	0.285	0.306	R	128.1	20.03	0.221	0.201	7.59	20.56	56.90	99.10	110.3	143.1														
0128:17	-30.92	163.33	35.03	16.50	65	0.276	0.296	R	125.4	22.38	0.227	0.204	8.02	20.24	59.43	102.42	110.8	137.1														
0130:28	-30.99	163.07	35.03	16.70	68	0.276	0.296	R	127.0	20.60	0.259	0.204	7.71	21.30	56.58	99.63	108.2	129.9														
0132:40	-31.06	162.81	35.04	16.89	65	0.279	0.299		121.0	20.37	0.208	0.201	7.71	20.25	58.59	98.16	109.5	133.9														
0134:51	-31.11	162.54	35.03	17.08	68	0.271	0.291		126.9	21.33	0.259	0.194	7.85	20.33	56.53	100.30	108.0	131.2														
0137:2	-31.17	162.28	35.03	17.27	67	0.281	0.302		125.0	19.42	0.182	0.200	7.73	20.65	59.57	100.07	113.6	136.2														
0139:14	-31.23	162.02	35.03	17.46	74	0.279	0.299		126.9	20.77	0.218	0.181	7.52	20.04	56.99	102.84	109.4	131.0														
0141:26	-31.31	161.77	35.03	17.68	67	0.282	0.303		123.3	20.61	0.207	0.182	7.34	19.40	57.64	97.76	107.															

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751109 (YR-MO-DAY)	DAY= 314	FLT NO= 8	NASA LATITUDE SURVEY - FALL 1976															
TIME	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMM:SS (GMT)	(DEG N)	(DEG E)	(KFT)	ANG (DEG)	PPB	OZONE (ATM-CM)	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)										
								BB	BB	NR	NR	NR	NR	NR	NR	NR	NR	NR
0148: 0	-31.57	161.00	35.04	18.35	54	0.285	0.305	127.2	19.71	0.206	0.176	7.20	20.07	57.32	98.76	110.8	131.1	
0150: 12	-31.66	160.74	35.04	18.57	53	0.282	0.302	121.1	20.02	0.223	0.160	7.04	19.08	54.28	100.68	106.0	130.1	
0152: 23	-31.75	160.48	35.04	18.79	58	0.286	0.307	122.4	19.80	0.193	0.162	6.95	19.00	55.88	95.62	109.2	127.9	
0154: 35	-31.83	160.22	35.06	19.02	59	0.289	0.310	123.7	18.63	0.224	0.154	7.04	19.82	57.24	102.28	112.5	134.1	
0156: 46	-31.92	159.95	35.96	19.24	58	0.284	0.305	127.5	21.87	0.233	0.164	7.40	19.43	58.95	102.22	109.9	136.6	
0158: 58	-32.00	159.69	38.46	19.47	80	0.287	0.311	130.8	20.08	0.220	0.174	7.26	20.27	59.06	100.52	113.4	133.6	
0201: 9	-32.08	159.44	38.99	19.69	82	0.277	0.300	127.7	21.83	0.248	0.175	7.70	20.20	58.73	103.49	109.3	136.1	
0203: 21	-32.16	159.19	38.99	19.92	69	0.283	0.306	132.9	20.96	0.248	0.177	7.50	21.03	59.30	104.93	113.9	134.8	
0205: 32	-32.24	158.94	38.98	20.15	93	0.285	0.308	128.8	21.25	0.213	0.176	7.45	20.05	60.16	101.90	113.7	134.8	
0207: 44	-32.32	158.69	38.99	20.39	65	0.280	0.302	126.3	21.64	0.244	0.165	7.50	19.71	58.54	103.42	109.2	135.6	
0209: 55	-32.39	158.45	38.98	20.62	65	0.279	0.301	127.6	20.38	0.246	0.162	7.34	19.82	57.14	101.27	108.1	130.9	
0212: 7	-32.47	158.20	38.98	20.85	61	0.284	0.307	128.0	20.45	0.218	0.168	7.04	19.80	57.06	99.61	109.8	126.4	
0214: 18	-32.55	157.95	38.98	21.09	60	0.281	0.304	115.5	19.99	0.214	0.161	7.20	18.85	57.13	98.46	107.1	130.9	
0216: 29	-32.63	157.70	38.98	21.32	74	0.283	0.306	122.2	18.93	0.222	0.156	6.73	18.63	53.41	96.46	105.9	125.6	
0218: 41	-32.70	157.44	38.99	21.55	139	0.286	0.310	125.5	20.49	0.201	0.160	7.05	19.01	57.85	97.37	109.1	133.0	
0220: 52	-32.78	157.18	38.99	21.77	159	0.281	0.306	129.9	20.49	0.234	0.157	7.25	19.85	57.41	103.13	111.0	134.3	
0223: 4	-32.85	156.91	38.98	22.00	140	0.288	0.313	128.3	20.10	0.206	0.155	6.81	19.15	57.32	97.77	109.2	130.7	
0225: 15	-32.93	156.65	38.98	22.23	174	0.279	0.304	120.8	19.86	0.227	0.145	6.87	18.57	54.11	98.16	104.1	127.6	
0227: 27	-33.00	156.38	38.99	22.45	140	0.289	0.314	124.9	19.17	0.205	0.151	6.57	18.56	55.66	94.72	108.0	127.9	
0229: 38	-33.08	156.11	38.98	22.67	142	0.282	0.307	123.9	20.21	0.233	0.143	6.94	18.92	56.22	100.59	106.9	132.0	
0231: 50	-33.15	155.84	38.98	22.90	138	0.286	0.311	125.9	19.33	0.199	0.146	6.73	18.68	56.24	96.39	110.1	128.2	
0234: 1	-33.22	155.58	38.98	23.13	133	0.283	0.307	121.0	19.73	0.215	0.138	6.74	18.41	54.98	97.67	105.8	129.7	
0236: 13	-33.29	155.32	38.98	23.35	133	0.289	0.314	125.7	19.05	0.201	0.141	6.48	18.66	55.88	95.58	108.4	128.0	
0238: 24	-33.37	155.05	38.99	23.58	138	0.283	0.307	122.8	19.84	0.224	0.132	6.78	18.63	55.50	99.28	107.5	130.5	
0240: 36	-33.44	154.79	38.99	23.80	143	0.290	0.315	125.1	19.19	0.198	0.137	6.49	18.33	56.05	95.43	109.0	129.2	
0242: 47	-33.51	154.52	38.98	24.03	145	0.282	0.306	119.9	19.86	0.224	0.128	6.56	18.06	53.72	97.22	102.4	127.4	
0244: 58	-33.58	154.25	38.98	24.25	139	0.296	0.322	124.7	18.71	0.200	0.134	6.32	17.83	59.23	98.79	107.0	127.3	
0247: 10	-33.62	153.97	38.99	24.46	127	0.284	0.308	123.6	19.31	0.228	0.131	6.61	18.58	54.23	99.19	107.0	129.1	
0249: 21	-33.66	153.68	38.99	24.65	110	0.287	0.311	122.4	19.84	0.206	0.133	6.57	17.78	55.89	96.03	105.6	131.0	
0251: 33	-33.70	153.41	38.09	24.85	113	0.288	0.311	121.3	17.57	0.195	0.129	6.29	17.99	54.38	94.68	107.9	126.5	
0253: 44	-33.73	153.11	34.15	25.04	85	0.283	0.304	129.6	18.74	0.203	0.110	6.03	16.70	50.83	92.44	100.7	121.9	
0255: 56	-33.77	152.81	29.65	25.22	78	0.297	0.316	120.0	18.01	0.177	0.102	5.57	16.02	52.43	91.95	102.0	126.2	
0258: 7	-33.80	152.51	24.88	25.41	67	0.300	0.315	121.4	16.35	0.176	0.088	5.06	15.23	48.67	84.87	99.7	121.0	
0300: 19	-33.82	152.22	19.37	25.59	83	0.302	0.316	114.9	15.60	0.165	0.071	4.58	14.28	45.73	82.70	96.6	115.3	

DATE= 761110 (YR-MO-DAY)										NASA LATITUDE SURVEY - FALL 1976									
THAR	LAT	LONG	PRESS	SUN	O3	MEAS	TOTAL	OZONE	OZONE	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMMSS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(E-06)W/(CH**2-NM)	(E-06)W/(CH**2-NM)	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATH-CN)													
2116:33	-38.58	145.19	37.03	65.11	158	0.289	0.314	R M	8.6	0.00	0.000	0.000	0.00	1.66	12.90	30.66	36.6	48.0	
2118:44	-38.84	145.13	37.04	64.72	172	0.277	0.301		58.5	2.98	0.000	0.000	0.18	2.47	17.64	40.62	50.2	62.0	
2120:56	-39.11	145.07	37.04	64.33	174	0.277	0.301		59.3	3.27	0.000	0.000	0.20	2.66	18.81	43.03	51.3	65.4	
2123: 7	-39.37	145.01	37.04	63.95	183	0.278	0.303		62.8	3.57	0.000	0.000	0.22	2.81	19.67	44.38	52.9	68.5	
2125:19	-39.63	144.94	37.04	63.57	196	0.282	0.307		61.7	3.57	0.000	0.000	0.24	2.83	20.19	44.75	53.6	68.3	
2127:30	-39.89	144.88	37.04	63.19	202	0.265	0.311		63.3	3.88	0.000	0.000	0.25	2.87	19.91	45.02	54.3	68.7	
2129:42	-40.16	144.81	37.04	62.82	196	0.286	0.312		64.3	3.84	0.000	0.000	0.27	2.99	20.56	46.56	55.1	70.5	
2131:53	-40.42	144.75	37.04	62.45	200	0.289	0.315		68.4	4.37	0.000	0.000	0.31	3.08	20.98	48.02	56.5	71.0	
2134: 5	-40.69	144.68	36.70	62.09	194	0.279	0.303	P	65.0	4.45	0.000	0.000	0.33	3.17	20.74	44.82	53.6	64.2	
2136:16	-40.95	144.61	32.07	61.73	82	0.291	0.311	A	59.6	3.95	0.000	0.000	0.24	2.77	18.91	42.08	50.3	63.1	
2138:28	-41.22	144.55	26.20	61.37	87	0.295	0.312	A	57.6	3.49	0.000	0.000	0.22	2.54	17.23	39.33	47.3	60.2	
2140:39	-41.48	144.48	21.54	61.02	73	0.226	0.237	PRT M	43.3	5.36	0.096	0.000	0.36	2.31	15.25	34.74	18.2	19.0	
2142:51	-41.51	144.36	21.01	60.70	92	0.441	0.463	RT M	224.7	12.43	0.247	0.000	0.52	4.17	33.50	80.06	127.9	188.0	
2145: 2	-41.29	144.43	21.02	60.22	73	0.309	0.324		57.3	2.77	0.000	0.000	0.20	2.53	17.32	39.91	50.0	62.9	
2147:14	-41.07	144.52	21.03	59.73	66	0.316	0.330		59.7	2.75	0.000	0.000	0.23	2.67	18.38	42.64	53.8	66.5	
2149:25	-40.85	144.61	21.03	59.24	79	0.310	0.324		64.8	3.29	0.000	0.000	0.31	3.08	20.39	46.69	57.6	71.7	
2151:17	-40.63	144.70	21.03	58.74	81	0.307	0.321		66.7	3.85	0.000	0.000	0.33	3.15	20.03	45.82	55.6	69.8	
2153:48	-40.40	144.79	21.03	58.25	82	0.303	0.318		66.5	4.07	0.000	0.000	0.40	3.43	21.25	47.29	57.7	72.1	
2156: 0	-40.18	144.88	21.03	57.75	81	0.303	0.318		69.5	4.20	0.000	0.000	0.47	3.75	22.68	50.54	61.6	75.2	
2158:12	-39.95	144.97	21.04	57.24	78	0.246	0.257	RT M	62.2	5.70	0.068	0.000	0.59	3.67	21.19	46.15	42.4	21.2	
2200:23	-39.82	144.91	18.17	56.86	89	0.319	0.334	PRTAM	40.3	0.00	0.000	0.000	0.52	5.93	40.83	90.96	115.7	103.2	
2202:35	-40.03	144.84	10.68	56.51	39	0.322	0.329	P A	61.8	3.01	0.000	0.000	0.34	3.09	19.82	45.10	56.8	72.4	
2204:46	-40.23	144.80	10.15	56.14	43	0.314	0.321		72.2	4.12	0.000	0.000	0.45	3.49	21.61	48.63	59.8	76.0	
2206:58	-40.40	144.75	10.15	55.78	37	0.318	0.324		68.8	3.80	0.000	0.000	0.45	3.59	22.52	50.15	61.3	78.0	
2209:10	-40.58	144.71	10.15	55.42	45	0.351	0.359	R M	76.7	3.40	0.000	0.000	0.41	3.69	25.11	56.56	70.9	107.5	
2211:22	-40.75	144.76	10.15	54.98	49	0.311	0.318	R	91.7	5.86	0.000	0.000	0.57	3.99	23.67	52.32	63.3	78.7	
2213:33	-40.90	144.93	10.15	54.46	66	0.310	0.318		67.2	4.14	0.000	0.000	0.58	3.96	23.04	50.69	60.2	75.4	
2215:45	-41.04	145.10	10.15	53.95	76	0.384	0.395	M	68.7	2.68	0.000	0.000	0.47	3.30	19.69	56.23	71.2	81.4	
2217:57	-41.19	145.27	10.16	53.43	70	0.313	0.322	P	70.0	4.84	0.000	0.000	0.60	4.12	23.76	51.21	60.9	74.6	
2220: 9	-41.36	145.48	13.71	52.90	53	0.300	0.309	P A	62.9	4.63	0.000	0.000	0.78	4.49	23.41	50.72	58.2	70.8	
2222:20	-41.55	145.69	19.18	52.37	61	0.301	0.313	TA	65.9	5.34	0.000	0.003	0.87	4.73	23.84	50.46	58.5	72.2	
2224:32	-41.74	145.92	23.17	51.83	64	0.297	0.312	A	71.3	5.93	0.000	0.004	1.11	5.54	26.93	55.71	63.5	78.6	
2226:44	-41.95	146.17	26.86	51.29	47	0.298	0.314	A	73.6	6.45	0.000	0.006	1.22	5.89	27.78	57.89	65.8	80.6	
2228:56	-42.16	146.43	29.59	50.75	46	0.298	0.316		75.9	6.73	0.000	0.007	1.34	6.23	28.82	59.28	67.5	82.5	
2231: 8	-42.38	146.70	32.47	50.21	59	0.299	0.319	A	76.3	6.96	0.000	0.008	1.39	6.35	28.90	59.22	66.9	81.5	
2233:19	-42.60	146.97	35.83	49.67	87	0.298	0.320		76.0	7.30	0.000	0.008	1.53	6.72	29.64	60.08	68.1	83.5	
2235:31	-42.76	147.26	37.91	49.12	170	0.200	0.217	PRT M	72.1	19.44	0.347	0.018	1.92	6.06	21.01	33.80	29.7	23.7	
2237:43	-42.57	147.37	38.32	48.60	198	0.300	0.327	R	17.7	11.33	0.119	0.011	1.75	7.41	31.55	65.11	73.0	88.6	
2239:55	-42.31	147.29	39.00	48.20	228	0.289	0.317	R	104.7	12.13	0.141	0.016	2.29	9.27	38.19	74.41	85.1	101.5	
2242: 6	-42.02	147.26	39.02	47.75	228	0.303	0.331		94.9	9.21	0.088	0.012	2.01	8.36	35.51	71.42	80.5	99.1	
2244:18	-41.74	147.23	39.02	47.30	233	0.298	0.322		91.6	9.58	0.099	0.014	2.15	8.69	36.21	71.80	80.7	97.7	
2246:29	-41.48	147.16	39.03	46.88	196	0.298	0.325	R	51.0	4.58	0.000	0.013	2.11	8.73	36.14	70.95	78.8	97.1	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 761110 (YR-MO-DAY)		DAY= 315		FLT NO= 9		NASA LATITUDE SURVEY - FALL 1976													
THBAR	LAT	LONG	PRESS	SUN	O3	MEAS	TOTAL	OOQQQ	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-MM) WAVELENGTH IN NM)										
(GMT)	N	E	(KFT)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB	
2250:52	-41.00	146.89	39.02	46.16	218	0.279	0.305	PR M	100.8	13.32	0.480	0.034	2.77	8.39	31.16	62.42	71.3	93.3	
2253:4	-40.76	146.79	39.02	45.76	213	0.298	0.325		95.4	10.85	0.099	0.017	2.59	9.75	38.89	78.06	87.2	105.1	
2255:16	-40.51	146.66	39.02	45.39	220	0.296	0.324		99.5	11.39	0.102	0.019	2.66	9.92	39.35	77.26	86.3	105.2	
2257:27	-40.28	146.53	39.02	45.01	211	0.295	0.322		100.1	11.40	0.107	0.020	2.74	10.29	40.37	78.29	87.5	106.7	
2259:39	-40.04	146.41	39.02	44.63	201	0.288	0.315		103.5	11.97	0.120	0.022	2.92	11.09	41.97	80.73	88.9	109.9	
2301:50	-39.79	146.28	39.02	44.25	190	0.289	0.316		102.2	12.21	0.118	0.022	3.00	11.01	41.47	81.41	89.2	108.9	
2304:1	-39.55	146.16	39.03	43.86	189	0.290	0.316		103.6	12.31	0.124	0.023	2.96	11.09	41.65	80.23	88.9	107.9	
2306:13	-39.31	146.03	39.02	43.48	194	0.287	0.314		106.0	12.56	0.120	0.028	3.18	11.43	42.09	81.18	90.6	109.7	
2308:24	-39.06	145.91	39.02	43.09	197	0.287	0.313		104.7	13.16	0.129	0.033	3.35	11.71	43.13	82.67	91.2	112.0	
2310:36	-38.81	145.79	39.02	42.70	204	0.286	0.312		104.3	12.95	0.134	0.035	3.41	11.87	42.95	82.46	92.0	111.1	
2312:47	-38.57	145.66	39.02	42.31	199	0.256	0.279	R M	100.4	15.96	0.239	0.039	3.59	11.80	42.03	73.10	62.2	85.2	
2314:59	-38.36	145.48	39.02	41.97	207	0.285	0.311	R	102.4	12.84	0.137	0.038	3.63	12.17	43.63	83.88	92.3	113.0	
2317:10	-38.17	145.26	39.02	41.67	173	0.282	0.307		107.6	13.91	0.131	0.041	3.75	12.67	44.34	84.18	93.7	114.9	
2319:22	-37.98	145.04	38.99	41.37	188	0.278	0.303		105.3	13.80	0.138	0.043	3.89	12.84	44.42	81.93	92.1	113.3	
2321:33	-37.79	144.83	35.93	41.06	124	0.266	0.287	PR AM	94.1	13.02	0.156	0.041	3.77	11.28	37.59	71.64	80.1	92.3	
2323:45	-37.59	144.62	28.36	40.74	68	0.225	0.239	RTAM	85.5	15.52	0.246	0.035	3.22	10.21	26.49	35.61	39.7	56.9	
2325:56	-37.61	144.47	24.96	40.45	91	0.253	0.267	RT M	156.8	24.75	0.394	0.075	6.85	21.76	73.43	127.99	132.2	160.8	
2328:8	-37.70	144.73	24.98	39.87	79	0.253	0.267	RT M	89.0	14.43	0.137	0.030	3.17	9.58	28.57	44.96	59.7	90.7	
2330:19	-37.86	144.96	24.96	39.15	72	0.290	0.306	R	101.4	13.40	0.000	0.019	3.34	10.22	35.96	73.71	84.6	103.6	
2332:31	-38.06	145.13	24.96	38.89	71	0.291	0.306		100.3	11.96	0.106	0.036	3.30	11.28	39.98	74.40	86.2	107.1	
2334:42	-38.26	145.30	24.97	38.44	69	0.337	0.355		87.1	8.08	0.000	0.022	2.93	9.12	38.40	70.57	88.9	114.5	
2336:54	-38.45	145.46	24.98	38.00	69	0.296	0.312		105.4	12.85	0.118	0.039	3.49	11.73	42.58	80.90	90.5	111.2	
2339:5	-38.64	145.63	24.98	37.57	70	0.297	0.313		103.2	12.79	0.126	0.040	3.54	11.88	42.91	82.16	90.3	112.9	
2341:17	-38.84	145.79	24.93	37.15	70	0.354	0.373	PRT M	114.1	7.96	0.000	0.039	3.58	13.05	50.13	116.56	135.9	159.3	
2343:23	-38.84	145.98	20.14	36.63	82	0.285	0.299	PRTA	130.4	14.87	0.229	0.042	3.72	12.32	42.90	78.85	87.2	109.0	
2345:40	-38.65	145.85	12.29	36.25	80	0.309	0.320	P A	102.4	10.81	0.098	0.025	2.81	10.14	38.49	74.21	83.6	104.8	
2347:52	-38.51	145.67	10.21	35.94	55	0.309	0.317		105.4	11.55	0.103	0.027	2.99	10.83	41.08	78.59	90.1	113.2	
2350:3	-38.40	145.51	10.22	35.61	62	0.305	0.313		108.3	11.66	0.103	0.029	3.04	10.67	39.24	75.03	88.0	112.1	
2352:15	-38.28	145.36	10.24	35.28	67	0.308	0.316	R	116.9	12.12	0.106	0.029	2.94	9.48	35.45	70.89	81.6	103.3	
2354:27	-38.15	145.22	10.23	34.93	63	0.314	0.323	R	99.3	10.14	0.000	0.029	2.83	9.93	36.79	76.68	85.8	106.9	
2356:38	-38.00	145.09	10.22	34.58	65	0.315	0.323		90.7	9.40	0.000	0.028	2.83	9.91	36.32	70.30	85.8	109.1	

DATE= 761111 (YR-MO-DAY) DAY= 316 FLT NO= 10 NASA LATITUDE SURVEY - FALL 1976										374.1 312.8 289.2 294.5 303.9 308.4 318.8 326.1 365.5 395.6									
TIME	LAT	LONG	PRESS	SUN	O3	MEAS	TOTAL	OZONE	MEASURED	DOWNWARD	SOLAR	FLUX	IN	(E-06)	W/(CH**2-NM)	WAVELENGTH	IN	NM)	
(GMT)	(N)	(E)	(KFT)	(DEG)	(PPH)	(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	NB	BB	
2129:42	-35.47	142.38	31.06	64.93	84	0.293	0.313	--	53.7	2.26	0.000	0.000	0.12	2.08	15.26	37.90	47.9	58.7	
2131:53	-35.19	142.43	31.06	64.46	107	0.289	0.309		55.2	2.40	0.000	0.000	0.16	2.29	15.95	39.31	48.3	62.7	
2134: 5	-34.91	142.48	31.05	63.99	115	0.289	0.309	---	56.9	2.48	0.000	0.000	0.15	2.37	16.77	40.20	50.7	61.1	
2136:16	-34.63	142.54	31.05	63.51	108	0.281	0.300		57.0	3.04	0.000	0.000	0.25	2.60	17.65	41.04	50.1	63.3	
2138 28	-34.36	142.60	31.06	63.02	93	0.185	0.197	RT M	56.7	7.84	0.160	0.000	0.60	3.16	18.88	16.52	11.9	12.7	
2140:40	-34.16	142.50	29.70	62.67	90	0.260	0.277	PRTAM	22.6	0.00	0.000	0.000	0.29	2.28	14.06	31.27	34.7	44.3	
2142:51	-34.16	142.24	25.29	62.43	100	0.297	0.314	PRT M	68.6	0.00	0.000	0.000	0.00	4.69	33.68	81.23	116.3	95.2	
2145: 3	-34.38	142.15	24.96	62.04	89	0.284	0.299		58.1	3.30	0.000	0.000	0.29	2.74	17.13	41.08	48.9	63.9	
2147:14	-34.61	142.10	24.97	61.62	87	0.282	0.298		61.3	3.66	0.000	0.000	0.33	3.01	18.92	42.61	52.7	68.1	
2149:26	-34.83	142.07	25.00	61.18	87	0.284	0.300	RT M	151.2	0.00	0.000	0.000	0.78	9.68	64.29	130.23	181.2	198.0	
2151:37	-34.83	142.22	24.96	60.61	88	0.268	0.283	RT M	11.1	0.00	0.000	0.000	0.27	2.48	14.42	31.57	37.2	45.0	
2153:49	-34.63	142.26	24.97	60.14	88	0.282	0.298		61.9	3.58	0.000	0.000	0.44	3.43	20.41	45.54	55.1	69.1	
2156: 0	-34.41	142.28	24.98	59.67	91	0.281	0.297		64.3	3.98	0.000	0.000	0.50	3.62	20.92	46.37	56.2	69.7	
2158:12	-34.20	142.31	24.70	59.20	89	0.218	0.230	PR M	57.5	5.70	0.076	0.000	0.67	3.71	19.57	39.34	35.9	17.0	
2200:24	-34.07	142.19	18.74	58.84	88	0.327	0.342	PRTA	22.2	0.00	0.000	0.000	0.31	2.83	16.09	39.58	51.5	75.7	
2202:35	-34.21	142.03	15.38	58.52	109	0.298	0.312	PRT	111.7	7.63	0.000	0.000	0.44	3.49	21.00	45.62	59.6	79.1	
2204:47	-34.42	142.01	15.01	58.08	76	0.292	0.303		59.6	3.27	0.000	0.000	0.45	3.27	19.06	41.86	52.5	67.4	
2206:58	-34.61	142.01	15.02	57.63	65	0.307	0.317	RT M	72.1	0.00	0.000	0.000	0.54	4.45	28.18	61.58	81.6	90.2	
2209:10	-34.79	142.12	15.03	57.09	58	0.292	0.302	M	54.9	3.50	0.000	0.000	0.48	3.28	18.66	40.54	50.1	62.2	
2211:22	-34.98	142.28	15.03	56.52	38	0.293	0.302	M	58.7	3.79	0.000	0.000	0.53	3.48	19.51	42.78	51.8	64.5	
2213:33	-35.17	142.44	15.03	55.94	42	0.289	0.297		61.9	4.33	0.000	0.000	0.65	3.88	21.21	44.79	53.5	67.5	
2215 45	-35.36	142.62	15.03	55.36	52	0.300	0.310		61.9	3.77	0.000	0.000	0.62	3.88	20.89	47.86	56.4	72.2	
2217:57	-35.54	142.82	15.02	54.76	51	0.291	0.300		65.3	4.77	0.000	0.000	0.74	4.08	21.09	45.49	54.2	69.0	
2220: 8	-35.72	143.04	15.04	54.14	48	0.296	0.305		66.3	4.33	0.000	0.000	0.79	4.40	22.52	48.05	59.7	74.5	
2222:20	-35.91	143.27	16.74	53.53	54	0.328	0.340	PR AM	60.5	4.47	0.000	0.000	0.67	3.27	17.47	42.13	52.2	63.6	
2224:32	-36.08	143.47	20.43	52.94	52	0.296	0.308	PR	69.1	5.25	0.000	0.000	0.91	4.90	24.61	50.51	60.2	72.6	
2226:43	-36.28	143.70	21.00	52.33	52	0.288	0.300	R	64.1	5.15	0.000	0.003	1.13	5.41	25.37	52.61	61.4	75.8	
2228:55	-36.50	143.91	20.99	51.74	57	0.289	0.301		72.2	6.13	0.000	0.004	1.24	5.77	26.57	54.89	64.5	80.1	
2231: 7	-36.73	144.13	20.99	51.16	59	0.287	0.300		72.7	6.27	0.000	0.004	1.30	5.97	26.71	54.70	64.5	80.9	
2233:19	-36.96	144.35	20.32	50.58	67	0.286	0.299		77.4	6.73	0.000	0.006	1.44	6.41	28.50	57.62	67.1	83.8	
2235:30	-37.18	144.57	15.65	50.00	50	0.291	0.301	P AM	82.3	6.79	0.000	0.005	1.44	6.67	29.80	60.57	72.8	92.2	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751112 (YR-MO-DAY) DAY= 317 FLT NO= 11 NASA LATITUDE SURVEY - FALL 1976																			
PDAR	LAT	LONG	PRSS	SUN	Q3	MEAS	TOTAL	00000	374.1	312.8	289.2	299.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(CM**2-NM)	(MEASURED	DOWNWARD	SOLAR FLUX	IN	(E-06)	W/(CM**2-NM)	WAVELENGTH	IN	NM)		
(GMT)	N)	E)	(KFT)	(DEG)		(ATM-CM)			DB	FB	NB	NB	NB	NB	NB	NB	DB	DB	
2342: 2	-40.29	145.57	34.15	37.48	49	0.323	0.346		83.73	9.17	0.000	0.037	2.71	9.37	-31.65	-68.58	85.9	96.9	
2344: 13	-40.57	145.69	35.00	37.15	68	0.281	0.301		91.4	12.52	0.122	0.059	3.95	12.30	40.90	76.19	84.1	103.6	
2346: 25	-40.86	145.81	35.01	36.83	74	0.276	0.296		98.4	13.74	0.143	0.064	4.27	12.98	42.86	79.00	86.3	105.2	
2348: 37	-41.13	145.99	35.00	36.49	68	0.284	0.305	R	131.3	17.10	0.161	0.062	3.98	12.21	40.36	76.35	85.5	105.9	
2350: 49	-41.39	146.22	34.99	36.11	68	0.278	0.298		98.8	13.81	0.145	0.065	4.26	13.06	42.57	79.51	85.1	106.7	
2353: 1	-41.65	146.44	35.00	35.75	72	0.282	0.303		102.4	14.03	0.147	0.067	4.32	13.22	43.34	80.83	89.4	110.1	
2355: 12	-41.90	146.66	35.01	35.40	70	0.283	0.304		103.2	13.82	0.147	0.065	4.28	13.35	43.68	80.19	89.2	108.6	
2357: 24	-42.15	146.88	35.01	35.07	74	0.281	0.302		103.3	14.09	0.142	0.066	4.40	13.60	43.89	80.51	89.7	109.2	
2359: 36	-42.39	147.10	34.99	34.74	67	0.283	0.304		103.9	14.50	0.149	0.070	4.45	13.76	44.89	82.91	90.6	110.8	
0001: 47	-42.64	147.33	35.02	34.43	70	0.282	0.302		107.5	14.78	0.148	0.073	4.67	14.16	45.82	83.96	93.7	112.7	
0003: 59	-42.89	147.55	35.01	34.14	74	0.290	0.311		109.0	14.30	0.115	0.067	4.47	13.68	45.51	82.82	93.7	115.3	
0005: 10	-43.14	147.74	35.01	33.88	69	0.285	0.306		109.2	15.09	0.148	0.073	4.72	14.24	46.41	84.19	94.3	117.1	
0008: 22	-43.40	147.93	35.01	33.63	74	0.284	0.305		107.4	15.02	0.153	0.075	4.75	14.24	45.99	85.33	93.6	116.7	
0010: 33	-43.66	148.13	35.01	33.40	131	0.286	0.308		108.0	14.98	0.165	0.075	4.76	14.28	46.69	85.51	94.6	115.6	
0012: 45	-43.92	148.33	35.00	33.18	73	0.288	0.309		107.8	15.55	0.157	0.076	4.75	14.20	46.88	87.12	93.4	116.2	
0014: 57	-44.17	148.52	35.02	32.98	83	0.291	0.312		110.1	15.52	0.164	0.072	4.64	14.25	47.08	87.04	94.0	116.1	
0017: 8	-44.42	148.72	34.99	32.79	75	0.289	0.310		113.2	16.02	0.157	0.073	4.75	14.84	47.50	87.71	96.0	119.7	
0019: 13	-44.68	148.92	35.00	32.61	82	0.290	0.311		115.4	16.25	0.157	0.075	4.94	15.02	49.23	89.35	99.6	120.8	
0021: 31	-44.93	149.12	35.00	32.45	151	0.290	0.313		114.5	15.98	0.153	0.075	5.00	14.81	48.09	89.56	99.4	123.5	
0023: 42	-45.17	149.32	35.00	32.30	66	0.294	0.315		114.7	16.11	0.166	0.072	4.77	14.64	48.50	89.55	98.4	119.2	
0025: 54	-45.42	149.52	35.00	32.16	69	0.295	0.316		118.7	16.51	0.166	0.074	4.91	14.93	49.91	91.72	100.9	122.6	
0028: 5	-45.67	149.72	35.00	32.04	68	0.297	0.318		119.9	16.64	0.171	0.075	4.91	15.10	50.35	92.89	102.1	124.9	
0030: 17	-45.92	149.93	35.01	31.94	75	0.297	0.319		118.1	16.37	0.168	0.073	4.88	14.93	49.31	91.98	101.4	125.2	
0032: 21	-46.16	150.14	35.01	31.85	76	0.295	0.316		116.5	16.12	0.168	0.074	4.92	15.14	49.68	91.76	100.5	124.0	
0034: 43	-46.41	150.35	35.01	31.77	75	0.297	0.318		121.1	16.40	0.167	0.073	4.90	15.43	50.56	93.58	101.5	126.3	
0036: 51	-46.66	150.56	35.02	31.71	79	0.300	0.322		121.3	16.59	0.168	0.072	4.91	15.32	51.66	93.07	103.0	126.6	
0037: 3	-46.90	150.77	35.00	31.66	60	0.301	0.322		119.6	16.27	0.160	0.071	4.82	14.90	49.89	92.51	102.8	125.0	
0041: 14	-47.15	150.99	35.01	31.63	57	0.302	0.324		117.3	16.09	0.165	0.068	4.74	14.63	48.99	91.73	102.2	124.4	
0043: 26	-47.39	151.21	35.01	31.62	57	0.302	0.324		115.8	15.71	0.165	0.067	4.70	14.67	48.86	91.23	100.6	125.7	
0045: 37	-47.64	151.43	35.02	31.62	105	0.300	0.323		119.5	16.32	0.168	0.069	4.93	15.20	50.64	94.45	103.2	129.1	
0047: 49	-47.89	151.65	35.01	31.63	50	0.300	0.321		120.1	16.48	0.158	0.069	4.92	15.21	50.62	94.29	103.8	128.1	
0050: 0	-48.13	151.88	35.01	31.66	52	0.301	0.323		119.8	16.35	0.163	0.069	4.82	14.99	50.72	93.34	101.9	124.9	
0052: 12	-48.37	152.10	35.00	31.71	70	0.298	0.320		120.8	16.94	0.178	0.072	4.90	15.28	50.41	93.88	102.5	127.4	
0054: 24	-48.62	152.34	35.01	31.77	95	0.302	0.324		122.3	16.93	0.167	0.071	4.88	15.19	51.18	95.64	104.4	127.6	
0056: 35	-48.87	152.57	35.00	31.84	112	0.301	0.324		119.3	16.11	0.168	0.068	4.81	14.98	50.39	93.38	103.1	125.9	
0058: 47	-49.11	152.81	35.00	31.93	118	0.305	0.329		119.8	16.11	0.163	0.066	4.66	14.63	49.79	93.56	103.2	125.3	
0100: 59	-49.35	153.05	35.01	32.04	114	0.302	0.325		118.4	16.07	0.167	0.065	4.71	14.82	50.02	92.74	101.8	125.0	
0103: 10	-49.60	153.29	35.01	32.16	112	0.303	0.327		121.2	16.58	0.172	0.066	4.71	14.99	50.34	94.28	103.2	129.2	
0105: 21	-49.85	153.54	35.01	32.30	111	0.305	0.329		120.6	16.35	0.164	0.063	4.66	14.86	50.83	94.71	103.9	127.9	
0107: 33	-50.10	153.79	35.00	32.45	110	0.304	0.327		120.0	16.02	0.159	0.061	4.65	14.77	50.37	93.11	103.3	126.7	
0109: 44	-50.34	154.04	35.00	32.61	103	0.306	0.329		118.4	15.66	0.154	0.058	4.54	14.47	49.49	92.09	102.4	125.8	
0111: 56	-50.58	154.29	35.01	32.78	92	0.305	0.328		117.7	15.78	0.160	0.058	4.49	14.38	49.28	92.29	100.7	125.7	
0114: 7	-50.82	154.54	35.01	32.97	72	0.306	0.328		116.7	15.48	0.156	0.056	4.45	14.13	49.01	90.93	100.3	123.2	
0116: 17	-51.06	154.79	35.01	33.17	59	0.309	0.331		116.5	15.38	0.153	0.053	4.33	13.93	48.94	91.47	100.9	123.1	
0118: 30	-51.29	155.05	35.01	33.37	57	0.307	0.329		117.1	15.34	0.154	0.053	4.35	14.23	49.56	92.29	101.0	125.0	
0120: 42	-51.53	155.31	35.01	33.59	125	0.306	0.330		119.6	16.10	0.164	0.053	4.36	14.33	49.66	93.79	101.3	126.3	
0122: 53	-51.77	155.59	35.01	33.83	55	0.311	0.334		118.1	15.75	0.158	0.050	4.15	13.70	48.27	91.77	100.3	124.6	
0125: 5	-52.01	155.86	35.00	34.08	57	0.311	0.333		115.0	14.73	0.153	0.047	4.06	13.38	48.09	89.02	98.0	119.7	
0127: 16	-52.24	156.13	35.01	34.33	57	0.314	0.336		115.4	14.88	0.156	0.046	3.99	13.11	47.49	89.21	98.2	121.4	
0129: 28	-52.47	156.41	35.01	34.60	53	0.309	0.331		115.7	14.77	0.157	0.046	4.06	13.47	48.19	89.13	98.7	121.1	
0131: 39	-52.70	156.69	35.00	34.87	49	0.312	0.334		116.5	14.85	0.154	0.045	3.95	13.21	47.73	89.00	99.4	121.3	
0133: 51	-52.93	156.97	35.01	35.16	49	0.311	0.333		114.3	14.46	0.153	0.043	3.90	12.92	46.43	86.97	97.5	120.0	
0136: 2	-53.16	157.25	35.01	35.45	57	0.313	0.336		115.5	14.44	0.147	0.040	3.83	13.06	47.67	88.87	98.9	120.7	
0138: 14	-53.39	157.54	35.01	35.76	58	0.316	0.338		116.1	14.53	0.148	0.038	3.72	12.68	46.89	88.89	98.1	120.4	
0140: 25	-53.62	157.84	35.02	36.08	58	0.319	0.342		113.5	14.22	0.145	0.035	3.57	12.32	45.98	88.21	97.6	119.5	
0142: 37	-53.85	158.14	35.00	36.41	58	0.319	0.342		112.2	13.86	0.140	0.033	3.48	12.23	45.31	87.30	97.4	120.1	

DATE= 761113 (YR-MO-DAY)		DAY= 318		FLT NO= 11		NASA LATITUDE SURVEY - FALL 1976												
TBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PBB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)									
(GMT)	N)	E)	(KFT)	(DEG)		(ATH-CN)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB
0144:48	-54.08	158.44	35.00	36.74	54	0.319	0.342		111.8	13.66	0.138	0.031	3.44	12.07	45.35	86.25	96.4	118.9
0147:0	-54.31	158.74	35.01	37.09	53	0.317	0.340		114.3	14.13	0.139	0.032	3.50	12.26	45.87	88.03	97.2	121.4
0149:11	-54.52	159.07	35.03	37.43	50	0.342	0.367	RT M	95.2	7.01	0.000	0.024	2.97	12.38	50.99	100.68	121.4	119.9
0151:23	-54.49	159.54	34.99	37.57	99	0.318	0.342		107.8	13.15	0.129	0.029	3.24	11.45	42.92	84.85	94.2	113.7
0153:34	-54.38	160.00	35.02	37.66	105	0.318	0.342		108.1	13.27	0.133	0.029	3.17	11.60	43.12	84.51	94.4	115.6
0155:46	-54.28	160.47	35.97	37.76	58	0.332	0.357		110.1	12.49	0.000	0.024	2.96	11.08	43.36	85.75	96.8	117.4
0157:57	-54.19	160.96	37.01	37.91	66	0.321	0.346		109.7	13.29	0.137	0.026	3.04	11.40	43.11	83.93	93.1	114.3
0200:9	-54.11	161.45	37.03	38.08	83	0.328	0.354		109.0	12.58	0.131	0.023	3.00	11.04	43.83	83.07	93.7	114.4
0202:20	-54.03	161.94	37.03	38.26	70	0.326	0.351		109.9	12.86	0.125	0.023	3.02	11.11	43.42	84.31	93.6	114.2
0204:32	-53.94	162.41	37.03	38.45	85	0.324	0.349		112.6	12.99	0.131	0.023	3.08	11.41	44.48	85.45	94.5	118.7
0206:43	-53.85	162.90	37.03	38.66	95	0.324	0.350		109.8	12.93	0.132	0.022	3.04	11.27	45.14	84.05	92.2	115.2
0208:55	-53.76	163.36	37.03	38.87	111	0.322	0.348		108.1	12.51	0.120	0.022	2.93	11.05	42.41	81.80	92.3	115.5
0211:6	-53.67	163.84	37.03	39.11	123	0.322	0.348		108.7	12.24	0.118	0.023	2.90	10.85	41.79	80.94	92.5	112.7
0213:18	-53.58	164.31	37.02	39.36	104	0.323	0.349		109.0	12.08	0.118	0.022	2.95	10.87	42.31	82.35	94.3	115.4
0215:29	-53.49	164.77	37.03	39.62	121	0.324	0.350		106.4	12.32	0.119	0.022	2.90	10.69	41.81	82.62	93.7	113.4
0217:41	-53.39	165.23	37.03	39.89	139	0.328	0.355		106.3	12.31	0.126	0.021	2.73	10.37	41.68	80.66	91.8	112.5
0219:52	-53.30	165.70	37.03	40.18	147	0.327	0.354		106.9	12.06	0.117	0.019	2.68	10.39	41.89	81.79	93.5	111.4
0222:4	-53.20	166.17	37.03	40.48	143	0.327	0.354		106.6	12.42	0.129	0.018	2.75	10.39	42.53	83.03	92.3	112.4
0224:15	-53.10	166.62	37.03	40.79	162	0.325	0.352		108.1	12.31	0.117	0.016	2.66	10.28	41.77	81.54	90.8	111.6
0226:26	-53.00	167.06	37.03	41.11	174	0.327	0.355		107.1	11.52	0.115	0.014	2.55	9.98	40.93	79.50	89.6	111.3
0228:38	-52.90	167.51	37.03	41.45	144	0.326	0.353		103.5	11.51	0.115	0.015	2.49	9.81	40.25	78.10	88.6	110.5
0230:49	-52.80	167.95	37.02	41.79	169	0.327	0.355		104.7	11.21	0.106	0.014	2.38	9.66	39.38	79.46	89.9	109.4
0233:1	-52.69	168.39	37.03	42.14	193	0.332	0.361		101.1	11.19	0.109	0.013	2.22	9.14	38.63	76.95	87.0	107.0
0235:12	-52.59	168.82	37.03	42.50	228	0.331	0.361		100.0	10.73	0.101	0.011	2.18	8.90	37.71	75.88	84.5	105.0
0237:24	-52.45	169.20	37.05	42.83	256	0.279	0.306	RT	98.1	9.78	0.322	0.026	3.49	12.77	49.17	87.31	89.8	98.0
0239:35	-52.19	169.16	37.01	42.89	255	0.338	0.371	R	91.8	7.94	0.000	0.008	2.07	9.07	39.49	79.01	91.9	112.1
0241:47	-51.89	169.11	37.03	42.93	247	0.332	0.364		100.2	10.15	0.093	0.008	2.08	8.81	37.54	75.16	86.5	106.6
0243:58	-51.60	169.06	37.03	42.99	248	0.337	0.369		98.5	9.80	0.000	0.008	2.02	8.62	37.27	75.97	87.1	106.3
0246:10	-51.29	169.01	37.01	43.05	256	0.313	0.365		100.8	10.34	0.095	0.008	2.07	8.88	38.42	77.45	87.5	106.2
0248:21	-50.99	168.97	37.03	43.11	261	0.334	0.366		105.1	10.70	0.000	0.009	2.16	9.00	39.57	77.75	88.8	107.6
0250:33	-50.69	168.92	37.03	43.19	259	0.327	0.359		101.0	10.49	0.097	0.011	2.17	9.07	38.22	75.47	85.6	106.9
0252:44	-50.40	168.88	37.03	43.27	267	0.323	0.355		97.8	10.32	0.000	0.012	2.18	8.94	36.94	75.37	84.6	104.8
0254:56	-50.10	168.83	37.02	43.37	274	0.326	0.359		98.3	10.08	0.095	0.011	2.16	8.90	37.46	75.41	86.9	104.2
0257:7	-49.80	168.79	37.03	43.47	311	0.328	0.363		100.0	10.59	0.096	0.011	2.14	8.84	38.02	76.48	85.5	104.5
0259:19	-49.51	168.74	37.03	43.58	251	0.324	0.355		99.1	10.12	0.100	0.010	2.15	8.92	37.55	74.82	85.3	105.3
0301:30	-49.21	168.70	37.03	43.70	253	0.325	0.356		98.7	9.95	0.093	0.010	2.13	8.81	37.17	75.04	86.0	103.3
0303:41	-48.91	168.66	37.03	43.82	246	0.328	0.359		99.3	10.37	0.096	0.009	2.13	8.82	38.03	76.12	86.7	106.2
0305:53	-48.60	168.61	37.02	43.95	243	0.325	0.356		102.1	10.27	0.000	0.008	2.08	9.00	38.38	77.05	87.3	107.0
0308:4	-48.30	168.57	37.02	44.09	252	0.327	0.359		100.7	9.94	0.097	0.008	2.06	8.71	37.46	75.88	86.3	105.6
0310:16	-48.00	168.53	37.02	44.24	254	0.331	0.363		98.7	10.18	0.098	0.008	1.97	8.37	36.97	74.77	84.7	103.0
0312:27	-47.70	168.49	37.02	44.40	260	0.330	0.363		98.2	10.24	0.099	0.008	1.94	8.44	37.61	75.30	84.4	103.0
0314:37	-47.40	168.45	37.03	44.56	258	0.327	0.359		100.0	10.05	0.098	0.009	1.99	8.64	37.83	75.77	86.0	104.6
0316:50	-47.11	168.41	37.03	44.74	254	0.327	0.358		99.5	10.05	0.093	0.009	2.01	8.55	37.32	75.02	85.5	105.1
0319:2	-46.81	168.37	37.03	44.92	264	0.324	0.356		97.2	9.71	0.099	0.008	1.96	8.50	36.83	74.01	85.1	103.0
0321:13	-46.53	168.40	37.05	45.16	271	0.776	0.853	RT	91.6	0.00	0.000	0.000	0.35	3.59	18.40	56.65	89.6	120.1
0323:25	-46.36	168.74	37.00	45.45	266	0.322	0.354		99.5	10.48	0.092	0.007	1.90	8.37	36.97	74.13	83.5	102.7
0325:36	-46.22	169.09	37.00	46.17	263	0.317	0.349		95.8	10.22	0.097	0.006	1.90	8.37	36.05	73.28	82.7	104.7
0327:48	-46.07	169.45	37.03	46.69	306	0.318	0.352		97.1	9.38	0.100	0.006	1.81	8.02	35.73	71.23	81.5	99.8
0329:59	-45.93	169.81	37.03	47.23	261	0.323	0.355		95.9	9.20	0.096	0.006	1.69	7.57	34.75	70.91	80.0	98.8
0332:11	-45.75	170.13	37.03	47.73	262	0.318	0.349	RT M	83.0	17.29	0.335	0.011	1.55	6.53	29.80	61.64	68.6	84.0
0334:22	-45.50	170.34	37.03	48.15	261	0.317	0.348	R	95.5	9.50	0.000	0.000	1.61	7.66	35.25	71.75	81.0	98.9
0336:34	-45.26	170.58	37.03	48.60	255	0.317	0.347		90.6	8.71	0.000	0.005	1.56	7.11	32.81	66.80	75.8	94.9
0338:45	-45.01	170.83	37.03	49.06	257	0.312	0.343		89.3	8.50	0.000	0.004	1.50	6.97	31.68	65.61	73.7	93.5

DATE=	761114	(YR-MO-DAY)	DAY=	319	FIL NO=	12	NASA LATITUDE SURVEY - FALL 1976											
TBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	QQQQ	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(E-06)	(CH**2-MM)	WAVELENGTH IN NM								
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	BB	BB	BB	BB	BB	BB	BB	BB
0310:30	-45.09	170.19	32.30	43.78	54	0.315	0.336		97.4	10.17	0.093	0.012	2.15	8.89	37.11	73.73	82.6	101.0
0312:42	-45.30	169.91	33.02	44.04	55	0.312	0.333		95.3	9.69	0.097	0.014	2.12	8.73	35.57	71.27	81.4	99.3
0314:53	-45.50	169.63	33.01	44.29	57	0.310	0.331		93.9	9.40	0.000	0.014	2.06	8.61	34.69	70.10	80.2	97.4
0317:5	-45.70	169.35	33.02	44.54	59	0.318	0.340		92.2	9.26	0.086	0.013	1.97	8.08	34.48	69.46	78.2	95.5
0319:17	-45.90	169.06	33.02	44.79	62	0.318	0.340		90.1	8.87	0.086	0.012	1.89	7.99	34.37	68.79	77.1	95.3
0321:28	-46.10	168.77	33.01	45.04	62	0.318	0.340		89.7	8.91	0.084	0.011	1.85	7.93	33.89	67.75	77.7	96.2
0323:40	-46.30	168.48	33.02	45.28	60	0.276	0.295	R M	97.0	10.95	0.130	0.013	2.03	8.44	36.13	72.91	72.6	35.8
0325:52	-46.54	168.33	33.01	45.63	63	0.323	0.345	R	67.6	5.88	0.000	0.009	1.81	8.11	35.86	72.06	82.6	102.4
0328:3	-46.82	168.35	33.02	46.09	62	0.320	0.341		90.6	9.07	0.000	0.009	1.75	7.53	33.17	67.61	76.7	95.1
0330:15	-47.09	168.37	33.02	46.56	64	0.319	0.341		89.5	8.59	0.000	0.007	1.64	7.48	33.32	67.22	77.3	95.3
0332:26	-47.36	168.39	33.01	47.02	65	0.321	0.343		89.5	8.68	0.000	0.006	1.63	7.17	32.61	67.06	75.8	92.9
0334:38	-47.64	168.41	33.01	47.48	77	0.319	0.341		87.0	8.53	0.000	0.005	1.52	7.10	32.41	65.88	75.6	92.3
0336:49	-47.91	168.43	33.01	47.93	72	0.320	0.342		87.7	8.23	0.000	0.004	1.47	6.89	32.25	65.45	73.7	92.5
0339:1	-48.18	168.45	33.01	48.39	71	0.317	0.339		88.5	8.23	0.000	0.003	1.46	6.90	31.88	66.13	75.6	91.3
0341:12	-48.45	168.47	33.02	48.84	76	0.321	0.343		87.4	7.69	0.000	0.003	1.36	6.60	31.53	65.33	74.0	91.1
0343:24	-48.73	168.49	33.02	49.29	79	0.318	0.340		85.2	7.76	0.000	0.000	1.32	6.45	30.98	63.20	72.1	90.0
0345:35	-49.00	168.51	33.01	49.73	84	0.316	0.338		85.7	7.93	0.000	0.003	1.31	6.45	31.06	63.50	72.8	90.5
0347:47	-49.28	168.53	33.02	50.18	74	0.318	0.340		86.6	7.69	0.000	0.003	1.28	6.35	31.03	65.23	73.9	90.9
0349:58	-49.55	168.55	33.02	50.62	85	0.317	0.339		84.5	7.43	0.000	0.000	1.20	6.15	30.12	62.76	73.6	89.3
0352:10	-49.83	168.57	33.02	51.06	103	0.318	0.341		83.9	7.04	0.000	0.000	1.13	5.90	29.59	61.73	71.2	88.4
0354:21	-50.11	168.59	33.02	51.50	96	0.322	0.344		83.3	6.85	0.000	0.000	1.05	5.67	28.95	62.14	72.0	87.9
0356:33	-50.39	168.61	33.02	51.93	75	0.323	0.345		83.8	6.99	0.000	0.000	1.00	5.46	28.53	59.61	69.8	89.5
0358:45	-50.67	168.63	33.02	52.36	89	0.319	0.341		81.1	6.77	0.000	0.000	0.97	5.36	27.79	60.16	68.8	85.7
0400:57	-50.95	168.65	33.02	52.79	49	0.319	0.340		79.4	6.57	0.000	0.000	0.88	5.23	27.27	58.55	70.0	84.5
0403:7	-51.24	168.67	33.02	53.22	51	0.319	0.341		79.4	6.13	0.000	0.000	0.83	5.14	27.34	58.61	69.2	86.2
0405:19	-51.52	168.70	33.01	53.65	53	0.321	0.343		81.1	6.29	0.000	0.000	0.81	4.98	27.50	58.59	68.1	85.7
0407:30	-51.81	168.72	33.02	54.07	41	0.322	0.344		79.2	6.06	0.000	0.000	0.75	4.66	26.23	57.24	65.7	82.3
0409:42	-52.10	168.74	33.02	54.49	50	0.321	0.342		76.2	5.80	0.000	0.000	0.72	4.48	25.27	55.33	64.6	79.3
0411:53	-52.38	168.77	33.02	54.91	54	0.319	0.340		75.6	5.77	0.000	0.000	0.69	4.42	24.84	55.52	64.3	79.1
0414:5	-52.67	168.79	33.02	55.32	58	0.320	0.342		76.5	5.55	0.000	0.000	0.64	4.33	24.94	56.06	65.7	78.8
0416:16	-52.95	168.82	33.02	55.74	54	0.317	0.339		74.7	5.42	0.000	0.000	0.59	4.25	24.73	53.83	63.6	79.5
0418:28	-53.24	168.84	33.01	56.15	44	0.318	0.339		73.9	5.03	0.000	0.000	0.55	4.10	24.18	52.82	63.9	78.5
0420:39	-53.53	168.87	33.02	56.55	43	0.320	0.341		74.1	4.96	0.000	0.000	0.50	3.92	23.95	52.71	62.3	78.0
0422:51	-53.81	168.89	33.02	56.95	46	0.322	0.343		73.9	4.73	0.000	0.000	0.47	3.77	23.40	52.35	62.5	77.1
0425:2	-54.10	168.92	33.02	57.35	47	0.323	0.344		72.6	4.80	0.000	0.000	0.44	3.60	22.97	51.59	60.7	76.4
0427:14	-54.40	168.94	33.02	57.75	45	0.320	0.342		69.1	4.59	0.000	0.000	0.40	3.46	22.24	50.37	59.2	73.1
0429:25	-54.69	168.97	33.02	58.15	49	0.320	0.341		69.2	4.45	0.000	0.000	0.38	3.40	21.93	49.21	59.4	74.3
0431:37	-54.98	169.00	33.02	58.54	53	0.322	0.344		69.1	4.04	0.000	0.000	0.32	3.24	21.54	48.87	58.9	73.2
0433:48	-55.27	169.02	33.02	58.93	59	0.324	0.345		68.1	4.04	0.000	0.000	0.31	3.09	21.03	48.29	57.6	72.5
0436:0	-55.56	169.05	33.01	59.31	66	0.324	0.346		67.7	3.89	0.000	0.000	0.27	2.97	20.41	47.67	57.6	70.5
0438:11	-55.85	169.08	33.01	59.69	106	0.327	0.351		66.8	3.63	0.000	0.000	0.24	2.84	20.19	47.00	57.3	70.9
0440:23	-56.12	169.10	33.02	60.06	49	0.324	0.346		66.0	3.51	0.000	0.000	0.21	2.79	19.92	46.37	56.6	70.4
0442:34	-56.40	169.13	33.02	60.43	52	0.326	0.348		66.0	3.41	0.000	0.000	0.19	2.63	19.72	45.75	55.2	68.9
0444:46	-56.69	169.16	33.02	60.80	56	0.322	0.344		64.1	3.57	0.000	0.000	0.18	2.56	19.01	44.83	53.9	66.1
0446:57	-56.97	169.18	33.02	61.16	60	0.324	0.346		62.9	3.28	0.000	0.000	0.15	2.44	18.57	43.40	53.3	65.7
0449:9	-57.25	169.21	33.01	61.52	53	0.326	0.348		64.0	3.15	0.000	0.000	0.13	2.35	18.65	43.58	53.4	66.2
0451:20	-57.54	169.24	33.02	61.88	59	0.328	0.350		62.8	3.02	0.000	0.000	0.12	2.29	18.27	43.85	53.4	66.0
0453:32	-57.82	169.27	33.02	62.23	47	0.323	0.345		61.6	2.90	0.000	0.000	0.00	2.28	17.94	42.43	53.2	65.7
0455:43	-58.10	169.29	33.02	62.58	47	0.325	0.346		60.8	2.78	0.000	0.000	0.00	2.14	17.71	42.42	51.5	63.9
0457:55	-58.37	169.32	33.02	62.92	57	0.322	0.344		59.8	2.87	0.000	0.000	0.00	2.09	17.40	41.16	51.0	63.1
0500:6	-58.65	169.35	33.02	63.27	72	0.320	0.342		59.5	2.68	0.000	0.000	0.00	2.02	17.28	40.28	49.8	63.0
0502:18	-58.92	169.38	33.03	63.60	70	0.331	0.353		58.6	2.65	0.000	0.000	0.00	1.90	16.40	40.43	50.0	61.6
0504:29	-59.21	169.41	33.02	63.94	60	0.329	0.352		57.9	2.46	0.000	0.000	0.00	1.79	16.34	39.76	48.2	61.1
0506:41	-59.50	169.44	33.02	64.27	66	0.352	0.376		59.5	2.40	0.000	0.000	0.00	1.63	15.74	39.39	50.2	61.7
0508:52	-59.79	169.48	33.25	64.60	71	0.347	0.371		55.3	2.08	0.000	0.000	0.00	1.54	15.41	38.15	48.4	59.5
0511:4	-60.08	169.54	34.53	64.94	71	0.370	0.397	R	37.4	0.00	0.000	0.000	0.00	1.55	16.26	41.68	53.5	66.4

DATE= 751116 (YR-MO-DAY)		DAY= 321		FLT NO= 13		NASA LATITUDE SURVEY - FALL 1976																
TBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	OCOOO	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6				
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-MM)										WAVELENGTH IN NM			
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	NB	NB				
0111:31	-41.80	174.21	30.30	26.75	67	0.349	0.371		121.2	14.53	0.145	0.038	3.77	13.13	48.46	93.34	103.2	126.7				
0113:43	-41.59	174.47	31.84	26.94	126	0.345	0.370		116.5	13.96	0.145	0.043	3.84	13.16	47.49	90.62	101.6	125.9				
0115:54	-41.39	174.74	32.90	27.15	196	0.340	0.369		114.8	14.01	0.140	0.044	3.92	13.37	48.16	90.54	100.5	123.6				
0118: 6	-41.17	175.02	33.02	27.38	197	0.339	0.367		116.8	14.59	0.143	0.047	3.91	13.39	48.30	90.84	100.0	122.0				
0120:18	-40.95	175.29	33.01	27.63	209	0.338	0.367		118.1	14.53	0.143	0.049	4.07	13.66	48.86	93.27	104.5	126.8				
0122:30	-40.73	175.56	33.00	27.88	236	0.332	0.362		119.0	15.13	0.158	0.052	4.21	13.94	49.20	93.06	103.3	126.9				
0124:41	-40.50	175.83	33.01	28.16	257	0.331	0.363		116.8	15.15	0.158	0.052	4.21	13.70	48.96	91.84	101.6	125.8				
0126:53	-40.28	176.10	33.01	28.46	261	0.329	0.361		118.4	14.87	0.157	0.050	4.13	13.73	48.76	92.01	101.1	122.9				
0129: 5	-40.06	176.37	33.01	28.77	272	0.332	0.364		119.0	15.15	0.149	0.049	4.09	13.79	49.19	93.34	102.4	125.9				
0131:16	-39.83	176.63	33.01	29.10	286	0.332	0.366		120.8	14.99	0.147	0.048	4.12	13.80	49.41	92.98	105.0	127.1				
0133:29	-39.61	176.88	33.01	29.44	232	0.330	0.359		119.9	14.85	0.161	0.048	4.14	13.61	48.52	93.48	103.0	126.0				
0135:39	-39.39	177.14	33.01	29.80	250	0.330	0.361		118.6	14.58	0.148	0.046	4.01	13.52	48.31	91.82	102.0	124.6				
0137:51	-39.17	177.40	33.01	30.17	248	0.335	0.366		118.8	14.49	0.143	0.044	3.86	13.24	47.97	91.84	104.0	124.8				
0140: 3	-38.94	177.66	33.01	30.55	288	0.335	0.369		120.8	14.73	0.156	0.042	3.92	13.34	48.63	93.65	104.2	128.3				
0142:14	-38.71	177.91	33.01	30.95	310	0.344	0.380	R	114.5	12.53	0.000	0.039	3.70	13.93	56.13	101.34	106.5	122.7				
0144:26	-38.45	178.10	33.01	31.11	314	0.335	0.371		117.6	14.41	0.143	0.039	3.72	12.86	47.74	91.34	101.4	123.1				
0146:37	-38.18	178.27	33.01	31.65	334	0.331	0.368		117.5	14.20	0.143	0.038	3.75	13.08	47.62	90.44	101.8	125.0				
0148:49	-37.90	178.43	33.01	32.00	341	0.334	0.371		117.9	14.10	0.142	0.035	3.68	12.67	47.04	90.80	100.9	122.7				
0151: 0	-37.62	178.60	33.01	32.37	335	0.342	0.380		115.6	13.64	0.135	0.031	3.41	12.07	46.10	88.67	100.5	121.6				
0153:12	-37.34	178.76	33.01	32.75	331	0.346	0.384		113.8	13.33	0.127	0.027	3.22	11.59	44.68	87.58	98.5	120.5				
0155:23	-37.06	178.92	33.01	33.14	316	0.347	0.384		113.7	12.77	0.125	0.025	3.10	11.53	44.42	86.57	99.0	120.8				
0157:35	-36.77	179.09	33.01	33.54	309	0.345	0.382		115.5	12.92	0.124	0.023	3.10	11.71	45.27	88.75	99.7	122.2				
0159:47	-36.47	179.25	33.01	33.95	291	0.348	0.383		115.3	12.82	0.118	0.023	3.05	11.48	45.57	88.60	99.0	121.0				
0201:58	-36.20	179.42	33.01	34.38	252	0.343	0.375		114.1	12.88	0.123	0.023	3.00	11.39	44.43	87.36	97.2	118.4				
0204:10	-35.90	179.58	33.01	34.81	235	0.332	0.362		112.7	12.99	0.128	0.028	3.22	11.74	44.63	85.98	97.4	117.6				
0206:21	-35.61	179.75	33.01	35.26	103	0.319	0.342		111.0	13.69	0.139	0.036	3.52	12.22	44.77	86.15	96.3	118.3				
0208:33	-35.30	179.92	33.01	35.71	74	0.307	0.328	P	115.2	13.96	0.151	0.043	3.92	13.05	46.19	88.35	99.2	121.5				
0210:44	-35.01	179.93	33.01	36.17	73	0.265	0.283	R	116.8	14.47	0.151	0.056	5.54	16.24	52.88	93.36	101.8	121.9				
0212:56	-34.70	179.56	33.01	36.56	83	0.293	0.314		104.8	13.25	0.136	0.046	3.94	12.80	44.28	82.95	91.6	113.0				
0215: 8	-34.40	179.81	33.01	36.96	120	0.289	0.310		107.4	14.02	0.142	0.049	4.06	13.09	44.87	84.37	92.0	114.2				
0217:13	-34.09	179.75	33.01	37.37	125	0.288	0.310		107.0	13.89	0.140	0.049	4.00	13.03	45.07	84.31	91.8	112.9				
0219:31	-33.79	179.70	33.01	37.78	87	0.287	0.308		107.6	13.84	0.138	0.048	3.98	12.92	44.75	83.50	91.8	112.9				
0221:42	-33.49	179.64	33.01	38.20	97	0.284	0.304		108.5	14.30	0.142	0.051	4.05	13.16	45.42	84.34	92.4	113.0				
0223:54	-33.19	179.59	33.01	38.63	133	0.283	0.304		107.7	14.03	0.139	0.049	4.09	13.00	45.06	84.50	92.9	113.7				
0226: 5	-32.89	179.54	33.01	39.06	125	0.282	0.302		105.7	13.88	0.141	0.046	3.93	12.70	43.76	81.06	90.9	111.2				
0228:17	-32.59	179.48	33.01	39.50	118	0.281	0.304		103.4	13.64	0.132	0.044	3.77	12.26	42.63	81.19	89.0	109.1				
0230:28	-32.29	179.43	33.02	39.95	108	0.282	0.303		105.2	13.82	0.133	0.042	3.77	12.38	43.47	82.02	89.9	110.0				
0232:40	-31.99	179.38	33.01	40.41	115	0.281	0.302		108.2	13.94	0.129	0.041	3.80	12.50	44.15	82.72	90.8	112.2				
0234:51	-31.69	179.33	33.01	40.87	107	0.283	0.303		104.2	13.19	0.126	0.040	3.64	12.05	42.75	80.82	89.8	110.9				
0237: 3	-31.38	179.27	33.01	41.34	92	0.281	0.300		100.7	13.15	0.128	0.039	3.52	11.74	41.72	79.01	87.4	106.3				
0241:15	-31.08	179.22	33.31	41.81	106	0.275	0.294		102.3	13.13	0.126	0.038	3.57	11.96	41.77	78.31	85.9	105.9				
0243:26	-30.78	179.17	34.54	42.29	112	0.237	0.255	RT N	92.3	14.19	0.190	0.039	3.39	11.30	38.92	72.43	61.7	43.3				
0245:38	-30.49	179.02	35.04	42.86	116	0.263	0.283	R	85.1	13.56	0.234	0.048	3.94	12.07	41.42	76.91	85.9	108.3				
0247:49	-30.23	178.79	35.03	43.51	114	0.275	0.296		103.8	13.26	0.131	0.038	3.57	11.76	42.61	81.01	89.3	109.6				
0249: 1	-29.97	178.55	35.03	44.17	109	0.273	0.294		104.1	13.23	0.130	0.034	3.41	11.67	42.25	79.10	86.7	108.9				
0250:12	-29.72	178.33	35.03	44.82	113	0.271	0.292		101.9	12.41	0.121	0.031	3.35	11.28	40.59	77.67	86.5	107.4				
0252:24	-29.47	178.11	35.04	45.48	119	0.274	0.295		99.8	12.45	0.125	0.028	3.11	10.88	40.21	76.98	84.8	105.6				
0254:35	-29.23	177.87	35.04	46.16	115	0.335	0.360	RT	93.1	11.23	0.100	0.006	0.97	7.49	34.47	71.90	81.3	103.7				
0256:47	-29.06	177.56	35.03	46.90	112	0.274	0.295		102.8	12.22	0.117	0.021	2.90	10.34	39.11	75.99	84.2	106.6				
0258:58	-28.89	177.24	35.03	47.66	116	0.277	0.299		98.3	11.60	0.108	0.018	2.67	10.03	39.24	75.78	84.7	104.3				
0301:10	-28.72	176.94	35.04	48.40	121	0.273	0.294		96.8	11.31	0.103	0.017	2.53	9.63	37.33	72.15	80.4	102.1				
0303:21	-28.55	176.63	35.04	49.15	124	0.274	0.295		92.5	10.49	0.096	0.016	2.39	9.05	35.92	70.27	78.7	97.5				
0305:33	-28.38	176.32	35.04	49.91	120	0.259	0.290		92.9	10.83	0.106	0.016	2.39	9.13	36.33	70.88	78.4	98.2				
0307:44	-28.21	176.01	35.04	50.67	117	0.265	0.285		95.4	10.74	0.100	0.015	2.36	9.18	36.20	70.67	78.7	100.1				
0309:56	-28.04	175.71	35.03	51.42	116	0.268	0.289		93.6	10.08	0.097	0.012	2.20	8.65	35.27	70.47	78.8	98.3				
0312: 7	-27.86	175.41	35.04	52.18	115	0.266	0.286		93.0	10.13	0.096	0.010	2.07	8.45	35.02	69.24	76.2	97.8				

DATE= 751116 (YR-MO-DAY)				DAY= 321		FLT NO= 13		NASA LATITUDE SURVEY - FALL 1976											
FBAR	LAT	LONG	PRESS	SUN	O3	MEAS	TOTAL	OCQOO	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6	
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PBB	OZONE	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)	WAVELENGTH IN NM)										
(GMT)	N	E	(KFT)	(DEG)		(ATM-CM)		BB	BB	NB	NB	NB	NB	NB	NB	NB	BB	BB	
0314:19	-27.69	-175.11	35.03	52.95	94	0.265	0.285	90.7	9.40	0.086	0.008	1.94	7.99	33.10	66.83	74.8	96.2		
0316:31	-27.51	-174.80	35.04	53.71	103	0.265	0.285	86.2	9.08	0.083	0.006	1.81	7.56	32.69	65.05	73.0	90.8		
0318:42	-27.34	-174.50	35.04	54.47	111	0.260	0.280	85.5	8.82	0.000	0.005	1.73	7.39	31.51	63.57	71.0	90.9		
0320:54	-27.17	-174.20	35.04	55.24	102	0.261	0.281	83.6	8.46	0.000	0.003	1.62	7.03	30.99	62.29	71.3	89.0		
0323: 5	-26.99	-173.90	35.04	56.01	91	0.257	0.276	83.8	8.38	0.000	0.000	1.52	6.90	30.80	61.95	69.2	88.1		
0325:17	-26.81	-173.60	35.04	56.78	90	0.260	0.279	80.9	7.87	0.000	0.000	1.39	6.31	29.04	59.69	68.0	86.0		
0327:28	-26.63	-173.30	35.04	57.55	88	0.258	0.277	79.8	7.54	0.000	0.000	1.22	6.03	28.52	58.46	65.3	84.0		
0329:40	-26.45	-173.00	35.04	58.32	87	0.257	0.276	77.7	7.04	0.000	0.000	1.11	5.57	26.98	55.51	62.2	80.1		
0331:51	-26.27	-172.70	35.04	59.10	89	0.259	0.279	75.0	6.35	0.000	0.000	0.99	5.10	25.66	53.13	61.5	78.4		
0334: 3	-26.09	-172.41	35.03	59.87	88	0.257	0.276	73.7	6.33	0.000	0.000	0.88	4.90	25.31	52.42	60.3	77.1		
0336:14	-25.91	-172.12	35.04	60.64	84	0.259	0.278	T 73.6	5.92	0.000	0.000	0.82	4.58	24.54	51.89	60.0	77.6		
0338:26	-25.73	-171.82	35.04	61.42	85	0.254	0.273	72.7	5.91	0.000	0.000	0.71	4.45	24.04	51.41	58.7	75.8		
0340:37	-25.55	-171.53	35.04	62.19	92	0.257	0.276	69.2	5.26	0.000	0.000	0.61	3.99	22.09	49.10	56.6	74.1		
0342:49	-25.37	-171.24	35.04	62.96	89	0.256	0.275	66.6	4.95	0.000	0.000	0.52	3.71	21.95	47.25	55.3	71.6		
0345: 0	-25.19	-170.96	35.04	63.74	111	0.256	0.275	65.3	4.55	0.000	0.000	0.46	3.37	20.56	44.73	52.9	69.8		
0347:12	-25.01	-170.69	35.03	64.50	118	0.257	0.277	63.7	4.24	0.000	0.000	0.36	3.11	19.80	44.16	52.4	68.8		
0349:23	-24.84	-170.41	35.03	65.26	190	0.255	0.277	62.2	4.14	0.000	0.000	0.29	2.92	19.20	43.88	51.2	66.8		

DATE= 761117 (YR-MO-DAY) DAY= 322 PLT NO= 14 NASA LATITUDE SURVEY - FALL 1976										MEAS TOTAL 00000 374.1 312.8 289.2 294.5 303.9 308.4 318.8 326.1 365.5 395.6									
THBAR	LAT	LONG	PRESS	SUN	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)									
(GMT)	(N)	(E)	(KFT)	(DEG)			(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB
2228:55	-13.53	-170.39	17.18	10.70	28	0.229	0.237	A	112.6	19.03	0.204	0.342	9.47	21.89	56.22	94.89	99.4	122.2	
2231: 7	-13.31	-170.30	19.67	10.32	40	0.228	0.237		113.7	20.02	0.215	0.366	9.72	22.01	56.74	95.38	99.7	124.4	
2233:20	-13.07	-170.22	21.81	9.97	66	0.225	0.235		113.3	20.25	0.217	0.401	10.27	23.16	58.12	95.46	101.6	125.5	
2235:32	-12.82	-170.12	23.74	9.66	57	0.210	0.220	M	114.9	22.03	0.229	0.432	10.50	21.67	59.77	95.00	96.5	104.0	
2237:44	-12.57	-170.03	25.72	9.38	21	0.229	0.240		101.6	20.06	0.209	0.444	9.92	22.60	55.30	93.17	99.1	123.2	
2239:57	-12.30	-169.93	27.42	9.15	61	0.219	0.232		115.4	21.73	0.246	0.468	11.04	24.29	59.50	92.97	101.8	125.3	
2242: 3	-12.03	-169.83	29.07	8.97	-20	0.221	0.233		118.2	22.48	0.250	0.484	11.18	24.59	60.34	93.74	103.9	126.5	
2244:21	-11.76	-169.72	30.60	8.84	19	0.220	0.233		118.3	22.91	0.260	0.502	11.38	24.80	60.37	92.46	104.6	129.3	
2246:34	-11.48	-169.62	32.26	8.76	18	0.220	0.234		121.2	23.36	0.268	0.523	11.73	25.74	62.38	93.81	106.5	130.6	
2248:46	-11.21	-169.52	33.02	8.73	18	0.220	0.234		122.2	23.82	0.272	0.527	11.73	25.62	62.40	93.84	106.3	129.7	
2250:59	-10.93	-169.41	33.02	8.76	17	0.219	0.233		122.0	23.62	0.272	0.532	11.85	25.67	62.22	93.24	106.4	131.4	
2253:10	-10.65	-169.31	33.01	8.84	18	0.220	0.234		123.9	23.87	0.270	0.537	11.93	26.14	63.47	94.10	107.8	132.2	
2255:22	-10.38	-169.21	33.02	8.97	20	0.221	0.235		124.6	24.24	0.276	0.531	11.79	25.80	62.81	94.07	107.4	131.3	
2257:34	-10.11	-169.11	33.02	9.15	19	0.220	0.234	R	123.8	24.45	0.288	0.530	11.65	25.64	62.63	93.56	104.0	129.6	
2259:46	-9.87	-168.95	33.01	9.34	20	0.234	0.249	R	102.5	23.24	0.262	0.463	10.93	25.75	62.64	93.48	106.3	129.7	
2301:59	-9.66	-168.75	33.02	9.56	23	0.220	0.234		124.3	24.30	0.278	0.541	11.77	25.80	62.61	93.90	106.8	131.3	
2304:10	-9.44	-168.56	33.01	9.83	25	0.220	0.235		124.5	24.08	0.278	0.540	11.71	25.74	62.30	93.67	106.4	131.3	
2306:22	-9.23	-168.36	33.02	10.15	26	0.220	0.234		125.3	24.34	0.282	0.547	11.83	25.84	62.63	94.39	107.4	133.1	
2308:34	-9.01	-168.16	33.01	10.52	25	0.219	0.233		124.5	24.03	0.281	0.541	11.79	25.50	61.99	93.57	107.5	133.1	
2310:46	-8.80	-167.96	33.01	10.92	30	0.218	0.233		123.5	23.90	0.282	0.543	11.73	25.40	61.37	93.37	107.1	132.6	
2312:58	-8.58	-167.76	33.01	11.37	144	0.219	0.236		122.6	23.77	0.277	0.534	11.56	25.09	60.81	93.04	106.7	131.6	
2315:10	-8.37	-167.57	33.02	11.83	20	0.219	0.234		122.5	23.77	0.273	0.529	11.46	24.97	60.76	93.64	107.1	128.8	
2317:22	-8.16	-167.37	33.02	12.34	23	0.220	0.234		122.5	23.93	0.280	0.527	11.43	24.95	61.14	93.87	106.4	130.6	
2319:33	-7.94	-167.17	33.01	12.87	26	0.225	0.240		124.3	24.76	0.259	0.502	10.99	24.60	60.53	94.23	104.8	130.4	
2321:45	-7.73	-166.98	33.00	13.41	29	0.217	0.231		121.1	23.70	0.281	0.527	11.58	25.15	59.61	94.73	106.5	132.8	
2323:57	-7.51	-166.78	33.02	13.98	26	0.222	0.236		125.3	24.59	0.290	0.520	11.20	24.75	61.06	96.84	106.7	130.1	
2326: 7	-7.30	-166.58	33.01	14.57	26	0.218	0.232		123.8	23.82	0.274	0.518	11.50	25.19	61.36	95.33	106.9	132.6	
2328:21	-7.09	-166.39	33.01	15.17	27	0.220	0.234		122.6	24.00	0.281	0.513	11.26	24.78	61.21	96.58	106.4	130.4	
2330:32	-6.87	-166.20	33.02	15.78	21	0.217	0.232		125.4	24.30	0.280	0.514	11.50	25.31	61.70	96.58	106.4	133.2	
2332:44	-6.66	-166.00	33.02	16.41	21	0.219	0.233		124.8	24.20	0.284	0.519	11.37	25.03	61.93	98.64	108.0	132.3	
2334:56	-6.44	-165.81	33.01	17.04	21	0.218	0.232		124.5	24.36	0.282	0.499	11.28	24.97	61.35	97.19	105.5	131.9	
2337: 8	-6.23	-165.62	33.01	17.69	22	0.217	0.232		122.6	23.38	0.276	0.495	11.09	24.31	60.15	97.58	105.7	130.1	
2339:13	-6.02	-165.42	33.02	18.34	29	0.218	0.232		125.1	24.25	0.278	0.482	11.11	24.76	61.21	98.73	105.2	131.8	
2341:31	-5.80	-165.23	33.01	19.01	31	0.219	0.233		124.0	23.66	0.274	0.478	11.04	24.44	60.96	100.58	107.4	132.3	
2343:43	-5.59	-165.03	33.01	19.68	87	0.216	0.231		123.1	24.04	0.270	0.464	10.93	24.21	59.84	99.41	104.6	130.8	
2345:55	-5.37	-164.84	33.01	20.36	23	0.217	0.231		120.9	23.03	0.266	0.457	10.76	23.79	59.70	100.20	104.8	129.4	
2348: 6	-5.15	-164.64	33.02	21.05	26	0.218	0.232		122.7	23.63	0.268	0.451	10.72	24.16	59.97	99.56	103.8	130.1	
2350:18	-4.93	-164.44	33.02	21.74	26	0.217	0.232		123.4	23.41	0.275	0.456	10.74	24.10	60.62	101.91	106.3	130.2	
2352:30	-4.72	-164.25	33.01	22.43	26	0.215	0.229		122.4	23.00	0.261	0.441	10.66	23.85	59.21	99.37	104.4	130.7	
2354:41	-4.50	-164.05	33.01	23.13	28	0.208	0.221	M	119.8	24.42	0.310	0.427	10.42	23.54	59.48	99.67	92.3	115.1	
2356:53	-4.28	-163.85	33.02	23.84	28	0.214	0.228		121.7	22.67	0.258	0.432	10.49	23.58	58.52	97.77	104.8	128.6	
2359: 5	-4.06	-163.65	33.02	24.55	30	0.188	0.200	M	124.4	26.27	0.357	0.420	10.62	22.90	52.31	82.20	84.4	104.2	
0001:16	-3.84	-163.45	33.02	25.27	35	0.193	0.206	M	121.4	17.19	0.400	0.397	9.57	22.44	55.38	82.79	148.7	0.7	
0003:22	-3.63	-163.26	33.01	25.96	33	0.213	0.227		120.7	23.05	0.254	0.400	10.30	23.35	58.89	98.61	103.9	128.6	
0005:34	-3.41	-163.07	33.01	26.68	27	0.212	0.226		121.4	23.63	0.284	0.396	10.06	23.16	59.51	99.73	98.7	124.6	
0007:45	-3.20	-162.87	33.01	27.40	34	0.212	0.226		120.9	22.40	0.253	0.308	9.76	22.52	57.81	96.98	99.0	120.7	
0009:57	-2.98	-162.67	33.02	28.13	28	0.225	0.240		118.7	22.40	0.146	0.337	8.96	22.09	57.01	94.07	99.2	124.4	
0012: 3	-2.76	-162.47	33.01	28.86	26	0.215	0.230		115.1	21.29	0.242	0.341	9.23	21.42	55.96	94.86	98.7	122.4	
0014:20	-2.54	-162.28	33.01	29.59	64	0.214	0.228		115.4	20.69	0.224	0.328	9.12	21.13	54.54	92.10	98.6	121.7	
0016:32	-2.32	-162.08	33.01	30.31	53	0.216	0.231		117.8	21.82	0.237	0.323	9.12	21.69	56.36	94.27	99.9	124.7	
0018:44	-2.11	-161.89	33.02	31.04	77	0.216	0.231		114.6	20.93	0.236	0.306	8.80	20.88	55.27	93.62	98.1	120.7	
0020:55	-1.89	-161.70	33.02	31.77	18	0.214	0.228		113.5	19.95	0.216	0.291	8.58	20.21	53.24	90.84	96.7	118.9	
0023: 7	-1.67	-161.50	33.02	32.51	28	0.215	0.229		114.0	20.47	0.221	0.278	8.48	20.36	53.52	90.63	96.0	120.0	
0025:18	-1.46	-161.31	33.02	33.24	19	0.215	0.229		113.3	20.32	0.227	0.275	8.35	20.16	54.28	92.05	96.0	119.8	
0027:30	-1.24	-161.11	33.02	33.98	23	0.213	0.227		111.4	19.41	0.213	0.262	8.16	19.43	51.94	89.30	94.9	117.5	
0029:41	-1.03	-160.93	33.01	34.71	25	0.215	0.229		109.6	19.32	0.206	0.241	7.81	19.14	51.43	87.35	92.2	116.4	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE=	761118	(YR-MO-DAY)	DAY=	323	PLT NO=	14	NASA LATITUDE SURVEY - FALL 1976													
FBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6		
HHMM:SS	(DEG)	(DEG)	(ALT)	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-MM) WAVELENGTH IN NM)											
(GMT)	N)	R)	(KFT)	(DEG)		(ATM-CM)			BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	
0031:53	-0.82	-160.73	33.01	35.44	27	0.216	0.230		110.7	19.63	0.216	0.236	7.76	19.14	52.65	89.64	93.6	116.1		
0034:5	-0.60	-160.54	33.02	36.18	34	0.214	0.228		109.8	18.83	0.201	0.226	7.62	18.71	50.97	87.91	93.7	115.8		
0036:16	-0.39	-160.35	33.02	36.92	33	0.214	0.228		106.9	18.52	0.197	0.205	7.24	18.03	49.26	84.29	89.4	112.5		
0038:28	-0.18	-160.16	33.01	37.65	29	0.216	0.230		103.1	17.65	0.197	0.190	6.81	17.17	48.33	82.92	86.7	108.6		
0040:39	0.04	-159.98	32.98	38.38	36	0.206	0.219	PRT	98.8	17.88	0.152	0.182	7.16	18.70	49.49	80.68	82.7	99.5		
0042:51	0.30	-159.88	33.01	39.08	29	0.214	0.228		103.1	16.93	0.177	0.177	6.77	17.17	48.22	82.87	89.4	111.1		
0045:3	0.57	-159.77	33.02	39.77	27	0.215	0.229		102.5	17.24	0.184	0.164	6.45	16.60	47.46	80.74	86.1	107.6		
0047:14	0.83	-159.67	33.01	40.47	28	0.215	0.229		99.0	16.32	0.182	0.156	6.19	16.04	46.36	80.39	84.6	104.8		
0049:26	1.11	-159.56	33.55	41.17	30	0.214	0.229		97.8	15.37	0.161	0.147	6.15	15.74	46.26	81.40	86.3	106.0		
0051:37	1.36	-159.46	35.31	41.86	25	0.214	0.229		101.3	16.15	0.170	0.142	6.09	15.82	45.93	80.86	86.4	106.2		
0053:49	1.62	-159.35	36.55	42.55	26	0.214	0.230		99.2	15.82	0.162	0.132	5.88	15.39	44.82	79.12	85.0	104.6		
0056:1	1.89	-159.25	37.03	43.25	21	0.213	0.228		97.9	15.57	0.163	0.121	5.71	15.05	44.02	76.83	82.1	103.2		
0058:12	2.15	-159.14	37.02	43.95	24	0.215	0.231		95.2	15.47	0.162	0.111	5.29	14.63	42.47	74.85	79.8	100.0		
0100:24	2.42	-159.04	37.02	44.64	87	0.217	0.233		95.6	15.38	0.160	0.104	5.22	14.42	43.77	75.73	80.6	101.3		
0102:35	2.68	-158.93	37.02	45.34	25	0.217	0.233		92.5	14.75	0.158	0.096	4.98	13.89	42.84	74.49	79.3	98.7		
0104:47	2.95	-158.82	37.02	46.04	27	0.215	0.231		91.4	14.20	0.155	0.089	4.78	13.25	41.37	72.82	76.6	95.2		
0106:58	3.22	-158.72	37.02	46.74	28	0.214	0.230		93.4	14.07	0.150	0.086	4.76	13.22	41.21	74.44	78.5	97.4		
0109:10	3.48	-158.61	37.02	47.44	28	0.215	0.231		93.6	13.85	0.142	0.080	4.60	13.03	40.96	73.87	78.7	97.0		
0111:22	3.75	-158.50	37.02	48.14	29	0.214	0.230		91.5	13.67	0.133	0.071	4.36	12.75	39.79	71.60	76.6	95.9		
0113:33	4.02	-158.40	37.02	48.84	29	0.214	0.230		88.2	13.29	0.136	0.064	4.12	12.16	38.47	69.13	73.5	93.9		
0115:45	4.29	-158.29	37.02	49.54	30	0.216	0.232		85.8	12.66	0.127	0.057	3.86	11.53	37.63	66.98	72.6	90.5		
0117:56	4.55	-158.18	37.03	50.23	28	0.218	0.234		85.7	12.16	0.123	0.051	3.60	11.02	36.15	65.55	71.3	89.0		
0120:8	4.81	-158.08	37.02	50.93	75	0.216	0.233		81.9	11.51	0.113	0.045	3.45	10.49	34.80	63.90	69.7	86.1		
0122:19	5.07	-157.96	37.02	51.63	25	0.216	0.232		77.7	10.51	0.098	0.039	3.28	10.18	34.15	63.53	68.3	85.4		
0124:31	5.33	-157.84	37.02	52.35	19	0.217	0.233		80.9	11.12	0.100	0.035	3.12	9.97	33.94	63.35	68.2	85.0		
0126:42	5.59	-157.71	37.02	53.06	23	0.217	0.233		81.1	10.84	0.102	0.031	3.03	9.77	34.29	64.35	68.2	85.9		
0128:54	5.85	-157.58	37.02	53.77	25	0.216	0.232		79.0	10.42	0.104	0.027	2.84	9.31	33.20	62.37	65.8	82.5		
0131:5	6.11	-157.45	37.02	54.48	26	0.217	0.233		75.2	9.89	0.097	0.024	2.55	8.70	31.52	58.89	62.6	79.4		
0133:17	6.37	-157.32	37.02	55.20	30	0.217	0.233		73.1	9.45	0.097	0.021	2.43	8.23	30.58	55.87	61.1	77.6		
0135:28	6.63	-157.20	37.02	55.92	28	0.216	0.232		73.5	9.22	0.090	0.018	2.29	8.10	30.16	55.36	61.0	77.1		
0137:40	6.89	-157.07	37.02	56.63	28	0.217	0.233		71.7	8.91	0.081	0.015	2.11	7.56	28.54	54.04	60.2	75.2		
0139:51	7.14	-156.94	37.02	57.34	29	0.216	0.232		69.3	8.33	0.074	0.013	1.98	7.07	27.41	52.29	57.9	72.2		
0142:3	7.40	-156.81	37.02	58.05	30	0.216	0.232		69.2	8.02	0.072	0.010	1.84	6.84	27.22	52.88	56.6	70.6		
0144:14	7.66	-156.68	37.02	58.77	30	0.214	0.230		67.3	7.82	0.068	0.008	1.73	6.74	26.89	52.66	56.7	71.9		
0146:26	7.92	-156.55	37.02	59.48	29	0.215	0.230		65.9	7.56	0.067	0.005	1.56	6.29	25.73	50.03	54.5	70.0		
0148:37	8.17	-156.43	37.02	60.19	30	0.215	0.231		63.1	7.22	0.060	0.003	1.42	5.87	24.58	47.77	52.9	68.1		
0150:49	8.42	-156.30	37.02	60.90	28	0.213	0.229		63.9	6.83	0.060	0.003	1.33	5.61	23.64	47.59	52.4	66.6		
0153:0	8.68	-156.17	37.02	61.61	26	0.214	0.230		62.5	6.50	0.060	0.002	1.21	5.25	23.22	46.93	51.0	65.0		
0155:12	8.94	-156.04	37.02	62.33	22	0.215	0.230		59.5	6.07	0.056	0.000	1.07	4.83	22.31	43.79	48.1	62.5		
0157:24	9.20	-155.91	37.03	63.04	21	0.214	0.230		57.4	5.74	0.060	0.000	0.93	4.45	21.00	42.05	46.6	59.8		
0159:35	9.45	-155.78	37.02	63.75	21	0.212	0.228		56.2	5.44	0.060	0.000	0.85	4.22	20.10	41.68	45.7	59.7		
0201:47	9.72	-155.65	37.02	64.47	24	0.212	0.227		55.6	5.12	0.060	0.000	0.76	3.95	19.70	40.82	44.5	57.1		
0203:58	9.98	-155.51	37.02	65.19	22	0.215	0.231	R	53.4	5.05	0.060	0.000	0.55	3.47	18.29	37.00	40.7	57.4		

DATE=	761118	(YR-MO-DAY)	DAY=	323	PLT NO=	15	NASA LATITUDE SURVEY - FALL 1976											
FBAR	LAT	LONG	PRESS	SUN	Q3	MEAS	TOTAL	QQQQQ	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMM:SS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(MEASURED	DOWNWARD	SOLAR	FLUX	IN	(E-06)	W/(CM**2-M)	WAVELENGTH IN NM			
(ZNT)	(N)	(E)	(KFT)	(DEG)		(ATM-CM)		RR	RR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1916:47	22.98	-154.70	32.95	58.69	68	0.250	0.267	64.5	5.94	0.000	0.004	1.24	4.89	22.71	49.40	56.2	68.3	
1918:59	23.15	-154.43	32.97	58.25	73	0.241	0.258	65.0	6.05	0.000	0.007	1.24	5.48	24.91	49.40	55.6	70.0	
1921:11	23.31	-154.15	32.99	57.82	80	0.243	0.260	64.9	6.09	0.000	0.007	1.25	5.56	25.06	50.50	56.1	69.9	
1923:23	23.48	-153.88	32.99	57.40	84	0.243	0.260	65.5	6.18	0.000	0.007	1.32	5.67	24.97	50.97	56.7	69.8	
1925:34	23.65	-153.60	32.99	56.98	86	0.244	0.261	65.4	6.44	0.000	0.008	1.39	5.89	25.96	51.48	57.1	72.4	
1927:46	23.81	-153.33	33.01	56.58	87	0.244	0.261	68.3	6.67	0.000	0.008	1.44	6.11	26.43	52.50	58.9	73.2	
1929:58	23.98	-153.05	33.00	56.18	73	0.243	0.260	68.5	6.55	0.000	0.008	1.50	6.34	26.50	52.71	60.8	74.3	
1932:9	24.14	-152.78	33.00	55.79	79	0.244	0.261	69.1	6.80	0.000	0.009	1.58	6.42	26.41	53.15	60.7	75.4	
1934:21	24.30	-152.51	32.99	55.41	55	0.246	0.262	70.7	6.37	0.000	0.008	1.64	6.68	27.48	54.79	63.5	77.5	
1936:33	24.46	-152.24	33.00	55.04	80	0.242	0.259	70.3	7.51	0.000	0.009	1.75	7.01	28.69	55.92	62.3	77.9	
1938:44	24.62	-151.96	33.00	54.68	82	0.238	0.255	72.2	7.58	0.000	0.010	1.83	7.22	28.44	55.69	61.9	77.1	
1940:56	24.78	-151.69	32.98	54.33	84	0.244	0.261	72.9	7.85	0.000	0.010	1.86	7.17	28.52	55.99	63.4	80.3	
1943:8	24.94	-151.42	32.98	53.99	77	0.245	0.262	74.7	7.70	0.000	0.011	1.88	7.42	29.72	57.66	64.7	79.9	
1945:19	25.10	-151.15	32.96	53.66	46	0.244	0.260	74.6	8.19	0.000	0.012	2.03	7.63	30.39	58.38	66.1	80.1	
1947:31	25.26	-150.87	32.96	53.34	40	0.243	0.259	75.0	8.51	0.000	0.013	2.11	7.78	30.86	58.91	64.4	82.3	
1949:42	25.42	-150.59	32.95	53.03	40	0.242	0.258	75.9	8.31	0.072	0.014	2.15	7.92	30.71	58.70	65.6	82.1	
1951:54	25.57	-150.31	32.97	52.73	43	0.237	0.253	77.3	8.89	0.075	0.015	2.27	8.41	31.69	60.24	65.4	81.8	
1954:5	25.73	-150.04	32.97	52.44	46	0.242	0.258	78.2	8.84	0.000	0.017	2.33	8.52	32.84	62.71	68.7	84.1	
1956:17	25.88	-149.75	32.95	52.16	48	0.241	0.257	75.8	9.16	0.086	0.018	2.37	8.53	32.22	61.13	67.5	84.0	
1958:28	26.04	-149.47	32.94	51.89	46	0.240	0.256	78.4	9.10	0.081	0.019	2.44	8.53	31.78	61.41	68.2	83.4	
2000:40	26.20	-149.19	32.93	51.63	76	0.238	0.254	80.5	9.54	0.077	0.019	2.51	8.98	32.44	63.13	69.5	85.7	
2002:52	26.35	-148.90	32.94	51.38	42	0.241	0.257	84.0	9.67	0.082	0.022	2.59	9.15	34.17	64.84	71.1	87.4	
2005:3	26.50	-148.63	32.94	51.15	53	0.240	0.256	80.9	9.53	0.081	0.022	2.56	9.12	32.74	63.36	71.4	85.7	
2007:15	26.65	-148.35	32.97	50.93	60	0.242	0.258	81.0	9.59	0.087	0.023	2.50	9.01	32.92	62.85	68.5	85.5	
2009:26	26.80	-148.08	33.00	50.72	67	0.246	0.262	81.5	9.54	0.093	0.023	2.54	8.94	33.47	63.19	69.9	86.6	
2011:38	26.94	-147.80	33.00	50.52	108	0.246	0.264	82.0	9.72	0.089	0.022	2.57	9.05	33.78	64.61	70.6	87.1	
2013:50	27.08	-147.53	33.02	50.33	158	0.250	0.269	82.8	9.86	0.085	0.021	2.55	8.87	33.44	64.38	70.1	88.2	
2016:1	27.23	-147.26	33.02	50.15	216	0.253	0.274	82.8	9.26	0.094	0.020	2.44	8.87	33.46	63.28	70.0	88.3	
2018:13	27.37	-146.99	32.98	49.99	215	0.256	0.278	81.8	9.36	0.086	0.017	2.35	8.66	33.02	63.02	69.1	87.4	
2020:24	27.52	-146.69	32.96	49.84	227	0.270	0.294	83.8	8.79	0.000	0.013	2.18	8.22	33.23	64.85	71.8	89.0	
2022:36	27.67	-146.41	32.95	49.70	257	0.272	0.297	82.1	8.28	0.000	0.012	2.08	8.16	32.72	64.16	71.4	89.7	
2024:48	27.82	-146.12	32.94	49.58	230	0.272	0.296	82.0	8.75	0.000	0.012	2.08	8.27	33.21	66.53	71.5	89.6	
2026:59	27.96	-145.84	32.99	49.46	187	0.277	0.300	83.7	8.80	0.086	0.013	2.12	8.23	34.28	66.30	72.4	90.9	
2029:11	28.10	-145.56	33.01	49.36	202	0.273	0.296	87.9	9.24	0.000	0.012	2.20	8.47	34.54	66.41	73.9	90.0	
2031:22	28.24	-145.29	33.02	49.27	156	0.276	0.297	85.8	9.73	0.088	0.013	2.30	8.56	35.36	67.25	74.6	94.5	
2033:34	28.37	-145.02	33.02	49.19	125	0.270	0.290	84.5	9.74	0.096	0.016	2.41	8.67	34.84	68.47	75.6	89.3	
2035:45	28.51	-144.74	33.03	49.13	76	0.268	0.287	84.9	8.06	0.000	0.017	2.54	9.12	33.18	70.03	83.8	97.0	
2037:57	28.65	-144.46	33.02	49.08	52	0.270	0.288	84.1	8.90	0.000	0.017	2.21	8.83	34.39	69.06	75.3	91.4	
2040:9	28.79	-144.17	33.00	49.04	49	0.274	0.292	82.8	9.12	0.000	0.019	2.37	8.53	34.70	66.53	74.5	92.5	
2042:20	28.94	-143.86	32.94	49.02	56	0.255	0.272	84.9	10.75	0.105	0.023	2.70	9.64	36.98	70.32	75.1	89.0	
2044:32	29.09	-143.55	32.96	49.02	64	0.258	0.276	84.2	9.66	0.097	0.022	2.55	9.49	35.74	71.91	74.7	90.7	
2046:44	29.24	-143.24	32.94	49.03	46	0.256	0.273	87.7	11.21	0.105	0.024	2.74	9.22	35.86	67.15	74.7	86.1	
2048:55	29.39	-142.93	32.93	49.06	44	0.253	0.270	81.6	10.56	0.107	0.024	2.59	9.68	36.60	68.17	72.3	87.4	
2051:7	29.53	-142.62	32.94	49.09	38	0.254	0.271	84.4	10.21	0.091	0.024	2.65	9.08	34.02	63.49	73.0	86.6	
2053:18	29.68	-142.31	32.96	49.14	35	0.249	0.266	81.8	9.82	0.102	0.026	2.86	9.53	35.21	67.30	72.8	91.6	
2055:30	29.82	-141.99	32.96	49.21	62	0.247	0.264	83.0	10.50	0.101	0.026	2.88	9.82	36.03	66.71	74.5	90.9	
2057:41	29.96	-141.68	32.95	49.29	39	0.249	0.265	86.2	10.97	0.101	0.023	2.85	10.18	39.21	70.70	73.0	89.3	
2059:53	30.11	-141.37	32.95	49.38	39	0.246	0.263	86.5	10.22	0.092	0.026	2.85	9.74	35.65	67.43	73.5	90.2	
2102:5	30.25	-141.05	32.95	49.48	35	0.269	0.286	86.2	10.27	0.085	0.026	2.73	8.79	37.99	73.50	76.6	90.7	
2104:16	30.39	-140.73	32.96	49.60	33	0.244	0.260	82.8	10.31	0.094	0.026	2.80	9.90	36.01	65.29	71.4	90.2	
2106:28	30.53	-140.41	32.95	49.74	33	0.242	0.258	82.8	10.04	0.101	0.026	2.85	9.63	34.69	65.55	71.9	89.0	
2108:39	30.67	-140.09	32.94	49.88	36	0.244	0.260	85.2	10.42	0.101	0.025	2.82	9.65	36.21	66.30	71.1	88.6	
2110:51	30.82	-139.77	32.94	50.04	36	0.241	0.257	84.1	10.42	0.095	0.025	2.83	9.71	35.30	66.26	71.3	89.0	
2113:2	30.96	-139.44	32.93	50.22	38	0.240	0.255	85.7	10.27	0.093	0.026	2.87	9.73	35.02	65.95	72.6	90.1	
2115:14	31.10	-139.11	32.93	50.41	69	0.241	0.257	81.7	10.23	0.103	0.027	2.79	9.43	34.50	64.83	70.9	88.4	
2117:25	31.24	-138.79	32.93	50.61	58	0.658	0.702	81.3	6.40	0.000	0.425	14.80	24.57	50.77	24.95	98.1	29.5	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE=	751118	(YR-MO-DAY)	DAY=	323	FLT NO=	15	NASA LATITUDE SURVEY - FALL 1976											
TIME	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMMSS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)	WAVELENGTH IN NM									
(GMT)	(N)	(E)	(KFT)	(DEG)		(ATM-CM)		BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB
2119:32	31.38	-138.46	32.94	50.82	54	0.239	0.255	81.0	9.83	0.089	0.024	2.70	9.40	34.38	65.34	70.2	87.2	
2121:43	31.52	-138.13	32.94	51.04	47	0.240	0.256	82.1	10.07	0.096	0.025	2.65	9.27	34.44	64.79	69.8	87.1	
2123:55	31.66	-137.79	32.94	51.29	47	0.240	0.256	81.2	10.27	0.090	0.025	2.64	9.08	33.77	64.49	69.8	86.9	
2126: 7	31.79	-137.46	32.96	51.54	45	0.234	0.249	79.9	9.81	0.095	0.025	2.71	9.16	33.22	62.90	68.9	85.5	
2128:18	31.93	-137.13	32.97	51.80	49	0.233	0.249	79.2	10.00	0.089	0.024	2.65	9.13	33.13	62.96	68.7	84.7	
2130:30	32.07	-136.79	32.94	52.08	66	0.232	0.248	81.9	9.91	0.092	0.023	2.67	9.21	33.73	63.33	68.6	85.8	
2132:41	32.20	-136.45	32.94	52.36	73	0.234	0.251	81.0	10.00	0.086	0.021	2.59	9.02	33.82	63.45	69.0	85.5	
2134:53	32.34	-136.11	32.95	52.66	59	0.236	0.252	82.1	10.04	0.088	0.021	2.53	8.91	33.74	64.25	69.9	87.1	
2137: 4	32.47	-135.78	32.98	52.97	43	0.232	0.247	80.4	9.79	0.093	0.021	2.52	8.87	33.24	63.03	68.5	84.5	
2139:16	32.60	-135.44	32.98	53.29	38	0.232	0.247	77.9	9.80	0.093	0.020	2.44	8.54	32.34	61.72	67.0	82.3	
2141:28	32.73	-135.10	32.98	53.62	41	0.230	0.245	78.3	9.34	0.088	0.019	2.40	8.52	31.92	61.41	66.4	82.9	
2143:33	32.86	-134.76	32.97	53.97	46	0.229	0.244	77.3	9.11	0.090	0.016	2.39	8.68	32.47	62.14	68.3	83.6	
2145:51	33.00	-134.41	32.97	54.33	51	0.228	0.244	78.4	9.20	0.082	0.016	2.37	8.40	32.03	61.50	66.4	83.1	
2148: 2	33.13	-134.06	32.96	54.69	51	0.225	0.240	78.5	9.53	0.080	0.016	2.35	8.45	31.90	60.83	66.2	82.4	
2150:14	33.25	-133.72	32.98	55.06	54	0.227	0.243	76.9	8.96	0.076	0.015	2.17	8.04	31.06	60.19	64.5	79.9	
2152:25	33.38	-133.37	32.99	55.45	57	0.226	0.242	74.7	8.62	0.075	0.014	2.09	7.75	30.18	58.08	63.2	77.6	
2154:17	33.51	-133.02	33.01	55.84	55	0.226	0.241	75.1	8.72	0.076	0.013	2.01	7.66	30.10	58.11	62.9	77.4	
2156:49	33.63	-132.67	32.98	56.25	54	0.226	0.242	74.4	8.31	0.073	0.012	1.93	7.35	28.93	56.19	61.8	77.5	
2159: 0	33.76	-132.32	32.95	56.66	55	0.228	0.244	71.9	7.72	0.069	0.010	1.82	6.99	28.04	54.66	60.9	76.9	
2201:12	33.88	-131.96	32.96	57.09	53	0.231	0.246	70.2	7.46	0.065	0.008	1.68	6.66	27.47	54.22	60.1	74.7	
2203:23	34.01	-131.61	32.95	57.52	54	0.234	0.249	69.3	7.19	0.060	0.006	1.53	6.23	26.30	52.34	58.5	73.4	
2205:35	34.13	-131.25	32.94	57.96	61	0.232	0.248	67.1	7.22	0.064	0.006	1.60	5.88	25.62	53.28	56.1	68.1	
2207:47	34.25	-130.90	33.00	58.41	26	0.231	0.246	63.2	6.76	0.068	0.005	1.39	5.82	25.83	46.68	54.8	67.6	
2209:58	34.36	-130.55	33.02	58.86	25	0.234	0.249	55.7	5.59	0.060	0.000	1.28	5.41	24.42	49.22	54.5	65.6	
2212:10	34.48	-130.20	32.97	59.32	53	0.225	0.240	57.6	6.15	0.094	0.002	1.17	5.37	22.44	44.86	52.1	66.5	
2214:21	34.59	-129.85	32.97	59.79	18	0.232	0.247	61.0	5.89	0.080	0.000	1.15	5.24	24.07	48.25	54.1	67.9	
2216:33	34.71	-129.50	32.97	60.26	20	0.228	0.242	61.2	6.22	0.080	0.000	1.11	5.07	23.34	46.61	51.7	64.2	
2218:45	34.82	-129.14	32.97	60.75	22	0.230	0.245	62.1	5.53	0.080	0.000	0.97	4.79	22.55	46.40	50.9	64.8	
2220:56	34.94	-128.78	32.97	61.24	21	0.241	0.257	61.6	5.84	0.051	0.000	0.94	4.21	21.29	48.55	47.8	65.4	
2223: 8	35.05	-128.41	32.93	61.75	21	0.234	0.249	61.0	5.27	0.080	0.000	0.86	4.34	21.63	44.87	51.1	64.7	
2225:13	35.16	-128.05	32.94	62.26	21	0.233	0.249	57.8	5.02	0.080	0.000	0.76	4.05	20.55	42.88	48.5	62.4	
2227:31	35.27	-127.68	32.98	62.78	20	0.235	0.250	57.3	4.53	0.080	0.000	0.65	3.78	19.88	42.05	47.2	60.1	
2229:42	35.38	-127.32	32.97	63.30	20	0.238	0.253	57.0	4.58	0.080	0.000	0.58	3.55	19.52	41.51	47.0	60.5	
2231:54	35.49	-126.96	32.97	63.82	22	0.239	0.254	56.7	4.29	0.080	0.000	0.52	3.36	19.11	40.49	47.2	59.4	
2234: 5	35.59	-126.60	32.97	64.35	24	0.236	0.251	52.9	3.99	0.080	0.000	0.46	3.12	17.95	38.17	43.6	57.0	
2236:17	35.70	-126.24	32.96	64.89	25	0.238	0.253	51.5	3.56	0.080	0.000	0.40	2.88	17.38	37.21	42.5	54.8	

5.3 GASP/JPL Flights - Fall 1975

A total of 11 flights was made with the UVS on the NASA CV-990 for the GASP/JPL series in the Fall of 1975. This was a feasibility test for the UVS, and it was mounted inside the CV-990, viewing the sun through a quartz window. This resulted in a 59° cut-off in the sun-diffuser normal angle, and required the analysis procedure described in Section 5.1.

Valid UVS data have been obtained for 7 of the 11 flights of 1975. Flights 1 and 8 have no UVS data for $\theta_{\text{sun}} < 75^\circ$, while no magnetic tape was received for flight 4. The magnetic tape for flight 2 appears to have a different format than the other tapes, and so was not processed. The remaining seven flights have varying amounts of valid UVS data, which are tabulated in the following pages. As noted in Section 5.1.3, the ozone thickness values are taken from the adjacent filter calculations only. The format is identical to that for the 1976 flights.

A change has been made in the set conditions for the N(noise) Q flag. The 0.1 volt standard deviation (see discussion in Section 5.2) is nearly always exceeded by the dark current and filters with low signal levels. This is because the greater gain of the photomultiplier allows use of much lower light levels, which increases statistical fluctuations in the low level outputs. Thus the N flag was set only if more than four standard deviations in signal voltage exceeded 0.1 volt. It will be seen in the tabulated data, that for $\theta_{\text{sun}} < 59^\circ$ the signal levels are generally large enough to avoid setting N, but that for $\theta_{\text{sun}} > 59^\circ$ the N flag is usually set. This is expected because the latter condition involves the lower signal levels from the Rayleigh scattered light alone. The calculated ozone thicknesses also show this increased noise, with the scatter increasing significantly for $\theta_{\text{sun}} > 59^\circ$. For $\theta_{\text{sun}} > 59^\circ$ it is thus better to average three or more consecutive ozone measurements to reduce the statistical errors. The flux values for $\theta_{\text{sun}} > 59^\circ$ are likely to have errors larger than 50%, because the direct solar flux is essentially being calculated from the Rayleigh scattered flux alone. Flux ratios are much more accurate, though, especially for nearby wavelengths.

The UVS data for the Fall 1975 flights, for $\theta_{\text{sun}} < 65^\circ$ and the altitude > 10 kft, are presented below.

The analyzed UVS data for the Fall 1975 NASA GASP/JPL flights on the CV-990 are presented in the following tabulations. Data are given for the flights listed below.

Table 5.2
List of UVS Flight Data for Fall 1975

Flight No.	Date (1975)	Minutes of Valid UVS data *	Page No. (s)
3	Dec. 2	120	45
5	Dec. 6	150	46-47
6	Dec. 8	230	48-49
7	Dec. 10	185	50-51
9	Dec. 14	245	52-53
10	Dec. 15	230	54-55
11	Dec. 16	125	56

*Data for $\theta_{\text{sun}} < 65^\circ$, and altitude > 10 kft.

DATE=	751202	(YR-MO-DAY)	DAY=	336	FLT NC=	3	NASA - GASP - FALL 1975 FLIGHTS															
BBAR	LAT	LONG	PRESS	SUN	MEAS	TOTAL	CCQQQ	.227.1	.302.3	.292.0	.307.5	.307.0	.311.1	.322.4	.329.7	.371.3	.401.9					
HHMMSS	(DEG)	(DEG)	ALT	AVG	PPB	OZONE	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)														
(LW2)	N	E	(KFT)	(DEG)		(ATM-CM)		BB	BB	BB	BB	BB	BB	BB	BB	BB	BB					
1654:23	37.11	-76.00	14.72	58.94	60	0.318	0.328		0.0	0.00	0.000	0.000	1.17	5.46	20.94	39.53	50.7	78.5				
1654:41	37.31	-75.86	14.72	59.14	58	0.325	0.336	N	0.0	0.00	0.000	0.000	1.09	5.31	21.50	38.10	46.6	68.5				
1656:53	37.52	-75.73	14.72	59.36	59	0.208	0.318	N	0.0	0.00	0.000	0.000	1.32	5.54	21.16	39.68	48.9	69.7				
1657:5	37.74	-75.59	14.72	59.59	60	0.333	0.344		0.0	0.00	0.000	0.000	1.09	5.25	22.15	39.06	51.7	78.5				
1711:17	37.93	-75.46	14.72	59.83	59	0.335	0.346	N	0.0	0.00	0.000	0.000	0.87	4.42	18.89	33.24	47.7	70.4				
1713:29	38.17	-75.31	14.71	60.07	57	0.321	0.331	N	0.0	0.94	0.000	2.162	1.23	4.10	17.99	25.99	34.1	62.7				
1713:41	38.38	-75.17	14.71	60.32	52	0.372	0.384	M	0.0	0.00	0.000	0.000	1.06	4.97	16.71	40.64	58.6	93.0				
1717:52	38.60	-75.03	14.72	60.59	53	0.417	0.431	M	0.0	0.00	0.000	0.000	0.46	3.41	20.17	36.83	55.8	90.5				
1719:4	38.82	-74.88	14.72	60.85	48	0.361	0.372	M	0.0	0.00	0.000	0.000	0.83	4.35	20.07	38.57	61.3	101.0				
1712:16	39.03	-74.74	14.71	61.12	50	0.371	0.382	N	0.0	0.00	0.000	0.000	0.71	4.26	19.74	38.70	66.3	110.6				
1718:28	39.24	-74.60	14.72	61.39	50	0.352	0.364	R	0.0	0.00	0.000	0.000	0.63	3.25	14.28	26.50	36.2	120.4				
1718:47	39.41	-74.47	14.76	61.63	49	0.384	0.396	RT	0.0	0.00	0.000	0.000	0.63	6.28	34.33	64.13	105.1	87.7				
1718:52	39.33	-74.58	19.23	61.59	55	0.314	0.327	PR	0.0	0.00	0.000	0.000	0.59	3.12	13.23	22.13	31.4	52.5				
1721:4	39.15	-74.66	19.89	61.46	57	0.346	0.360	N	0.0	0.00	0.000	0.000	0.78	3.91	18.16	33.23	46.7	76.1				
1723:18	38.99	-74.77	19.86	61.36	57	0.288	0.300	N	0.0	0.00	0.000	0.000	0.70	4.45	16.20	29.44	47.1	69.7				
1723:27	38.84	-74.87	19.97	61.27	57	0.410	0.428	N	0.0	0.00	0.000	0.000	0.45	4.60	20.18	41.85	74.3	145.9				
1727:33	38.18	-74.98	19.97	61.18	11	0.339	0.357	N	0.0	0.00	0.000	0.000	0.87	4.88	22.06	38.49	58.5	103.0				
1721:51	38.52	-75.00	19.97	61.08	51	0.353	0.367	N	0.0	0.00	0.000	0.000	1.08	5.97	26.50	50.00	76.9	150.1				
1732:3	38.35	-75.20	19.96	60.98	53	0.347	0.362	N	0.0	0.00	0.000	0.000	1.25	5.30	21.31	41.77	66.0	134.0				
1734:15	38.18	-75.31	19.96	60.88	52	0.334	0.348	N	0.0	0.00	0.000	0.000	1.13	5.94	26.29	44.60	68.2	107.2				
1735:27	38.01	-75.42	19.96	60.78	51	0.319	0.332	N	0.0	0.00	0.000	0.000	0.92	5.35	20.94	39.09	57.1	107.7				
1735:31	37.84	-75.53	19.97	60.69	54	0.340	0.354	N	0.0	0.00	0.000	0.000	0.75	4.61	19.20	35.88	62.9	58.9				
1737:51	37.67	-75.64	19.97	60.60	56	0.337	0.351	N	0.0	0.00	0.000	0.000	0.95	4.86	19.95	38.15	62.5	93.7				
1743:3	37.49	-75.75	19.96	60.51	57	0.357	0.372	N	0.0	0.00	0.000	0.000	0.96	4.67	22.12	37.87	59.3	90.5				
1745:13	37.32	-75.86	19.96	60.43	58	0.358	0.374	N	0.0	0.00	0.000	0.000	0.89	4.42	21.23	35.20	61.7	91.6				
1747:27	37.14	-75.97	19.96	60.34	58	0.307	0.320	N	0.0	0.00	0.000	0.000	0.98	5.06	18.97	33.55	64.3	91.8				
1747:33	36.97	-76.09	19.97	60.26	57	0.328	0.342	R	0.0	0.00	0.000	0.000	1.10	4.70	18.53	34.61	57.8	89.5				
1747:4	37.07	-76.04	24.73	60.61	62	0.462	0.486	RT	0.0	0.00	0.000	0.000	0.59	5.90	33.28	66.73	117.1	225.8				
1748:18	37.30	-75.57	25.02	60.99	62	0.319	0.336	N	0.0	0.00	0.000	0.000	1.23	5.79	23.44	43.95	58.2	89.4				
1748:26	37.55	-75.72	25.02	61.39	55	0.311	0.327	N	0.0	0.00	0.000	0.000	1.36	6.69	26.63	49.41	67.6	109.4				
1753:31	37.79	-75.56	25.02	61.80	135	0.329	0.349	N	0.0	0.00	0.000	0.000	1.19	6.75	28.70	51.74	89.6	144.8				
1758:47	38.04	-75.39	25.01	62.21	68	0.371	0.391	N	0.0	0.00	0.000	0.000	1.26	6.24	30.57	57.74	102.4	174.6				
1805:1	38.28	-75.24	25.01	62.62	62	0.341	0.359	N	0.0	0.00	0.000	0.000	0.93	5.77	27.67	48.19	89.0	154.7				
1807:13	38.52	-75.06	25.02	63.04	60	0.359	0.376	N	0.0	0.00	0.000	0.000	0.68	5.77	26.72	51.42	87.4	169.5				
1813:25	38.76	-74.92	25.02	63.46	62	0.338	0.356	N	0.0	0.00	0.000	0.000	0.82	5.53	24.43	45.38	89.6	160.1				
1811:37	38.99	-74.76	25.24	63.87	62	0.661	0.696	RT	0.0	0.00	0.000	0.000	0.00	3.52	26.94	67.08	150.2	305.9				
1813:47	39.03	-74.53	27.43	64.14	74	0.052	0.055	PT	0.0	7.67	0.262	4.387	0.86	1.62	5.02	9.04	7.0	7.7				
1815:1	39.32	-74.70	30.24	64.14	88	0.266	0.283	P	0.0	0.00	0.000	0.000	0.53	10.29	39.48	40.32	52.5	117.2				
1817:13	39.75	-74.42	31.04	64.10	72	0.333	0.355	N	0.0	0.00	0.000	0.000	0.73	4.01	19.16	35.42	55.6	93.2				
1822:24	39.54	-75.02	31.05	64.04	71	0.333	0.354	N	0.0	0.00	0.000	0.000	0.68	3.76	16.55	34.24	50.1	76.8				
1823:36	39.33	-75.15	31.05	63.98	81	0.294	0.314	N	0.0	0.00	0.000	0.000	0.90	4.04	15.24	30.46	41.9	76.7				
1828:43	39.13	-75.28	31.06	63.93	81	0.300	0.320	N	0.0	0.00	0.000	0.000	0.73	3.83	15.69	28.04	52.2	82.5				
1827:53	37.93	-75.41	31.05	63.88	82	0.325	0.346	N	0.0	0.00	0.000	0.000	0.82	3.82	17.06	33.69	46.3	76.5				
1827:12	37.73	-75.54	31.05	63.94	81	0.311	0.331	N	0.0	0.00	0.000	0.000	0.85	3.54	15.19	28.33	41.0	71.4				
1831:24	37.53	-75.64	31.05	63.81	80	0.310	0.330	N	0.0	0.00	0.000	0.000	0.82	3.81	16.05	30.34	43.0	79.2				
1834:33	37.34	-75.81	31.05	63.77	79	0.318	0.339	N	0.0	0.00	0.000	0.000	0.87	3.82	17.18	31.27	45.0	74.2				
1837:47	37.13	-75.95	31.06	63.74	85	0.326	0.348	N	0.0	0.00	0.000	0.000	0.79	3.72	16.09	30.47	53.3	85.5				
1837:57	36.93	-76.06	31.05	63.71	85	0.278	0.296	N	0.0	0.00	0.000	0.000	0.93	5.34	19.18	36.02	53.2	99.7				
1840:11	36.73	-76.22	31.75	63.68	82	0.320	0.341	R	0.0	0.00	0.000	0.000	0.83	4.32	20.02	34.02	63.0	69.0				
1842:23	36.63	-76.39	32.78	63.73	105	0.236	0.253	PT	0.0	1.87	0.102	1.072	0.90	3.83	12.29	22.01	28.1	42.2				
1844:34	36.80	-76.24	34.06	64.15	142	0.253	0.273	RT	0.0	22.61	0.435	3.513	1.78	7.44	28.79	30.05	36.3	57.0				
1846:46	37.01	-75.96	34.97	64.66	134	0.311	0.335	R	0.0	0.00	0.000	0.000	0.86	5.50	23.65	42.90	83.0	133.8				
1848:53	37.31	-75.78	35.00	65.20	133	0.323	0.348	N	0.0	0.00	0.000	0.000	1.04	4.61	21.08	40.30	64.5	114.9				

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

NASA - GASP - FALL 1975 FLIGHTS																															
DATE= 751206 (YY-MO-DAY)		DAY= 340		FLT NO= 5		MEAS TOTAL CQ000 227.1 302.3 292.0 307.5 307.0 311.1 322.4 329.7 371.3 401.9																									
TIME= 17:55 (HRS)		LAT (DEG)		LONG (DEG)		PRESS (KBT)		SUN (DEG)		OZONE (ATM-CM)		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)																			
												RB		RE		SR		SE		NB		NE		NB		NE		PB		PE	
1723:44	30.03	-79.03	32.96	52.57	26.	0.262	0.279	R	M	0.0	0.00	0.000	0.000	4.61	12.77	33.89	58.41	85.8	140.6												
1724:14	30.17	-78.74	32.95	52.78	27	0.267	0.264	R		0.0	0.00	0.083	2.687	4.41	13.76	37.94	61.56	66.6	88.2												
1725:14	30.24	-78.41	33.00	52.96	26	1.256	1.338	RT	M	0.0	10.79	0.720	0.000	1.72	8.54	25.42	83.25	255.9	630.6												
1730:24	30.43	-78.44	32.94	53.18	27	0.168	0.179	RT	M	0.0	3.18	0.246	7.308	6.39	14.50	34.18	45.71	49.0	60.7												
1732:34	30.37	-78.73	32.96	53.15	27	0.248	0.268			0.0	0.00	0.000	2.079	4.46	12.66	35.11	59.60	65.1	87.3												
1734:51	30.27	-79.03	32.96	53.09	27	0.257	0.273			0.0	0.00	0.000	2.419	4.51	13.68	36.87	56.93	74.1	89.6												
1737:11	30.18	-79.33	32.96	53.03	28	0.251	0.268			0.0	0.00	0.000	2.769	4.69	12.82	37.75	59.11	67.6	94.5												
1738:15	30.09	-79.63	32.96	52.97	28	0.257	0.274			0.0	0.00	0.000	2.268	4.61	13.84	37.65	60.29	70.1	90.4												
1741:27	30.00	-79.92	32.95	52.91	29	0.232	0.247			0.0	0.00	0.000	3.037	5.23	14.09	36.60	60.31	67.2	96.8												
1743:19	29.90	-80.22	32.96	52.85	28	0.240	0.255			0.0	0.00	0.000	2.455	5.16	14.11	38.26	61.16	71.0	92.6												
1745:51	29.81	-80.51	32.96	52.80	40	0.248	0.265			0.0	0.00	0.084	2.944	4.69	13.06	37.01	57.31	62.0	93.0												
1748:13	29.71	-80.80	32.96	52.74	193	0.266	0.288	R		0.0	0.00	0.000	1.872	4.00	12.94	32.33	52.47	65.9	82.0												
1750:16	29.62	-81.09	32.96	52.69	54	0.250	0.267			0.0	0.00	0.000	2.536	4.34	12.62	32.93	53.30	65.4	87.2												
1752:28	29.57	-81.39	32.97	52.67	56	0.645	0.689	RT	M	0.0	0.00	0.000	0.000	0.81	9.03	82.16	162.47	253.5	448.5												
1754:33	29.68	-81.65	32.96	52.83	61	0.219	0.234	R		0.0	2.09	0.076	3.291	5.30	13.34	35.13	55.88	55.0	96.5												

DATE= 751206		(YR-MO-DAY)		DAY= 340		FLT NO= 5		NASA - GASP - FALL 1975 FLIGHTS												
THRS	LAT	LONG	PRESS	SUN	03	MFAS	TOTAL	CCQQQ	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9		
TIME-SS	(DEG)	(DEG)	(KFT)	(DEG)	PPH	OZONE	CZONE		(MEASURED)	DOWNWARD	SOLAR	FLUX	IN	(2-06)	W/(CM**2-MM)	WAVELENGTH IN NM				
(MST)	N	E	(KFT)	(DEG)		(ATM-CM)			RR	FF	NE	NR	NR	NR	NR	NR	NR	NR	NR	
1753	3	29.48	-81.53	32.95	53.24	54	0.232	0.248	R	M	0.0	3.75	0.140	3.575	4.08	10.92	28.60	46.72	59.3	
1491	15	29.75	-81.21	32.97	53.28	53	0.253	0.270			0.0	1.76	0.073	3.202	4.31	12.57	35.70	55.61	58.2	
1133	27	29.60	-80.91	32.97	53.30	56	0.165	0.176	RT	M	0.0	0.00	0.251	9.199	6.60	11.21	31.84	46.55	59.4	
1533	33	29.34	-80.75	32.99	53.21	48	0.064	0.068	RT	M	0.0	6.65	0.355	7.389	5.41	13.13	22.37	16.96	10.9	
1407	51	29.29	-80.92	32.93	53.20	46	0.249	0.266	R		0.0	0.00	0.000	2.952	4.51	11.91	34.58	56.42	69.2	
1212	3	29.37	-81.16	32.97	53.39	52	0.309	0.329	RT	M	0.0	0.00	0.000	0.000	5.45	19.73	59.99	106.95	164.4	
1412	15	29.2	-81.27	32.97	53.75	56	0.253	0.270			0.0	0.00	0.000	2.751	4.21	12.21	34.42	56.32	65.5	
1414	27	29.81	-81.34	32.97	54.12	51	0.448	0.478	RT		0.0	2.19	0.000	0.000	1.16	7.45	36.47	62.95	65.7	
1416	33	30.16	-81.22	32.95	54.55	52	0.246	0.284	R	M	0.0	0.00	0.000	1.698	3.87	12.10	34.65	57.34	75.0	
1418	51	30.26	-80.98	32.95	54.85	56	0.163	0.174	RT	M	0.0	6.74	0.273	7.708	5.47	12.68	20.70	33.58	46.7	
1321	2	30.91	-80.93	32.95	54.78	52	0.255	0.273	RT		0.0	0.00	0.000	0.000	3.66	10.45	31.47	49.89	61.4	
1424	14	29.76	-81.07	32.93	54.66	52	0.260	0.287			0.0	0.00	0.000	2.040	3.06	9.78	29.30	45.33	52.7	
1425	20	29.50	-81.21	32.95	54.51	55	0.065	0.069	RT	M	0.0	4.93	0.242	5.776	4.02	10.44	31.16	16.40	12.6	
1427	17	29.36	-81.45	32.94	54.49	53	0.343	0.366	R	N	0.0	0.00	0.000	0.000	2.59	8.10	31.47	51.29	63.2	
1428	41	29.33	-81.72	32.99	54.55	55	0.297	0.317	RT	N	0.0	3.88	0.185	2.000	3.76	10.17	24.61	41.62	64.3	
1432	1	29.55	-81.70	32.95	54.94	54	0.303	0.323	RT	M	0.0	0.00	0.000	0.000	4.70	17.00	56.56	86.19	105.4	
1434	13	29.62	-81.40	32.96	55.32	54	0.270	0.289			0.0	0.00	0.000	2.087	3.24	11.32	32.06	53.49	57.6	
1435	24	29.78	-81.04	32.96	55.71	53	0.761	0.812	RT	M	0.0	0.00	0.000	0.000	2.59	10.63	35.70	115.87	163.3	
1436	36	29.73	-80.73	32.96	55.97	55	0.276	0.294	RT	M	0.0	0.00	0.000	2.097	3.99	11.75	36.56	57.37	68.1	
1440	44	29.55	-80.56	32.96	56.05	55	0.478	0.510	RT	M	0.0	20.72	0.428	0.000	2.36	7.92	82.83	145.94	251.6	
1442	53	29.45	-80.87	32.96	56.08	57	0.431	0.460	RT	M	0.0	0.00	0.000	0.000	2.46	17.50	79.62	143.14	289.9	
1445	11	29.55	-81.09	32.97	56.27	57	0.248	0.265			0.0	0.00	0.000	1.906	3.75	11.23	33.01	53.61	67.8	
1447	23	29.64	-81.37	32.98	56.47	55	0.130	0.139	RT	N	0.0	18.22	0.943	16.740	10.93	29.83	88.85	86.43	49.4	
1449	31	29.86	-81.55	32.95	56.79	57	0.260	0.277	R		0.0	2.27	0.000	2.229	3.05	9.64	29.77	47.82	57.8	
1451	43	29.12	-81.60	33.00	57.21	59	0.690	0.737	RT	M	0.0	0.00	0.000	0.000	0.00	19.24	99.16	225.00	461.5	
1453	53	30.12	-81.34	32.94	57.52	57	0.205	0.219	RT		0.0	0.00	0.000	4.017	5.62	15.06	41.96	57.77	62.8	
1456	7	29.87	-81.19	32.96	57.58	53	0.261	0.279			0.0	1.27	0.059	2.260	2.47	8.12	25.73	39.70	39.8	
1458	21	29.51	-81.08	32.97	57.70	53	0.243	0.302	R		0.0	0.00	0.000	0.000	1.88	5.87	19.29	30.58	50.6	
1501	33	29.32	-81.10	32.96	57.53	58	0.259	0.277	R	N	0.0	0.00	0.000	1.250	2.05	5.66	19.77	28.96	35.7	
1502	44	29.11	-81.26	32.97	57.57	54	0.205	0.219	RT	N	0.0	10.66	0.262	2.148	2.70	6.05	18.68	29.29	35.9	
1504	56	29.26	-81.43	32.96	57.86	59	0.360	0.384	RT	N	0.0	12.92	0.723	11.584	2.36	7.04	22.60	40.70	83.3	
1507	4	29.52	-81.36	32.96	58.35	54	0.256	0.275	R	M	0.0	0.00	0.000	1.805	2.42	7.75	25.47	39.35	45.2	
1510	13	29.73	-81.22	32.96	58.84	54	0.253	0.270	R	M	0.0	0.00	0.000	1.790	2.31	7.90	24.60	39.38	47.6	
1511	31	29.44	-80.99	32.96	59.37	56	0.103	0.110	RT	N	0.0	4.46	0.247	7.023	4.14	7.64	15.60	22.03	25.9	
1513	43	29.78	-80.70	32.97	59.62	56	0.274	0.292	RT	M	0.0	0.00	0.000	0.000	3.60	14.07	40.58	56.67	50.5	
1515	51	29.51	-80.65	32.96	59.67	56	0.192	0.205	R	N	0.0	6.94	0.470	6.914	5.40	14.14	50.18	88.89	56.3	
1518	5	29.31	-80.51	32.98	59.84	57	0.407	0.434	RT	N	0.0	0.00	0.096	0.000	1.85	5.83	17.83	36.01	54.9	
1520	17	29.52	-80.36	32.94	60.35	56	0.235	0.251	RT	N	0.0	2.02	0.091	1.527	1.71	5.68	17.28	28.89	32.1	
1522	29	29.80	-80.37	32.95	60.85	53	0.257	0.274			0.0	0.00	0.000	0.000	2.58	9.36	30.53	53.33	65.9	
1524	41	30.09	-80.36	32.96	61.36	56	0.221	0.235	RT	N	0.0	7.44	0.420	6.480	4.80	15.71	52.62	45.62	58.7	
1526	52	30.34	-80.23	32.95	61.91	58	0.248	0.265	R	N	0.0	0.00	0.000	0.000	3.71	12.88	41.76	68.07	113.2	
1528	4	30.44	-79.97	32.98	62.40	55	0.201	0.214	RT	N	0.0	3.42	0.169	4.671	2.94	9.20	29.63	44.57	29.0	
1531	13	30.20	-79.90	32.97	62.53	57	0.147	0.157	RT	N	0.0	2.80	0.147	2.742	5.50	12.88	20.82	26.03	27.1	
1533	27	30.02	-80.04	32.96	62.57	54	0.247	0.263	R	N	0.0	2.95	0.154	0.000	2.09	7.43	24.94	39.24	60.8	
1535	33	29.83	-80.21	32.97	62.59	55	0.280	0.299	R	N	0.0	0.00	0.000	0.000	2.13	6.83	26.14	48.18	74.4	
1537	51	29.74	-80.57	32.96	62.67	54	0.444	0.474	R	N	0.0	0.00	0.000	0.000	1.94	6.44	24.03	63.01	89.2	
1540	2	29.79	-80.85	32.99	62.85	53	0.240	0.257	RT	N	0.0	2.99	0.109	0.000	1.31	4.72	15.41	26.42	36.1	
1542	13	29.96	-80.76	32.94	63.35	55	0.299	0.319	RT	N	0.0	0.00	0.000	0.000	1.94	8.88	37.50	64.12	73.5	
1544	25	30.02	-80.72	32.97	63.86	117	0.292	0.314			0.0	0.00	0.000	0.000	1.53	5.91	23.26	41.84	70.9	
1546	33	30.02	-80.67	32.99	64.36	55	0.556	0.594	RT	M	0.0	0.00	0.000	0.000	0.00	1.06	28.59	63.88	88.6	
1548	44	29.28	-79.78	32.96	64.72	56	0.324	0.346	R	M	0.0	0.00	0.000	0.000	1.23	5.27	20.59	35.76	59.2	
1551	3	29.67	-79.70	32.96	64.92	57	0.278	0.297	RT	N	0.0	14.59	0.140	0.000	1.18	3.85	10.89	23.28	44.0	
1553	11	29.64	-79.97	32.96	65.06	57	0.261	0.279	RT	N	0.0	0.00	0.000	0.000	0.90	3.62	13.92	24.22	37.4	

DATE= 751208 (YR-MO-DAY)										NASA - GASP - FALL 1975 FLIGHTS									
TIME	LAT	LONG	PRESS	SUN	PPB	PLT HQ	MEAS	TOTAL	QCCQO	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9
MM:SS	(DEG)	(DEG)	ALT	ANG	PPB	03	OZONE	OZONE	(MEASURED)	DOWNWARD	SOLAR	FLUX IN	(E-06)	W/(CM**2-MM)	WAVELENGTH	IN NM			
(GMT)	N	E	(KFT)	(DEG)		(ATH-CM)			FB	FD	ND	NE	EB	NR	NR	NR	NR	NR	NR
155:33	32.51	-81.62	32.47	56.72	47	0.253	0.270	R N	0.0	0.00	0.000	1.430	2.69	8.65	25.03	41.61	52.6	63.7	
155:45	30.75	-81.82	32.33	56.83	47	0.262	0.279		0.0	0.00	0.000	1.501	2.67	8.42	26.16	43.86	53.2	69.7	
155:57	30.99	-82.03	32.34	56.93	47	0.276	0.294		0.0	0.00	0.000	1.673	2.23	8.67	25.28	46.01	50.3	71.6	
16:12.10	31.23	-82.24	33.81	57.04	50	0.255	0.273	N	0.0	0.00	0.000	1.938	3.14	9.41	30.79	48.27	49.8	69.6	
16:24.22	31.45	-82.43	34.98	57.18	70	0.277	0.297		0.0	0.00	0.000	1.357	2.19	8.63	25.58	44.54	51.0	68.7	
16:35.34	31.67	-82.63	34.96	57.24	179	0.287	0.311		0.0	0.00	0.000	1.907	2.22	8.45	27.53	43.62	52.0	68.4	
16:48.46	31.84	-82.84	35.00	57.33	242	0.277	0.303		0.0	0.00	0.000	0.000	2.31	7.51	24.48	43.17	53.4	67.1	
16:58.58	32.09	-83.05	35.00	57.43	239	0.287	0.314		0.0	0.00	0.000	1.539	2.36	7.56	26.42	44.19	51.1	70.8	
17:11.11	32.31	-83.26	34.97	57.53	45	0.287	0.308	N	0.0	0.00	0.000	1.303	2.11	7.75	26.05	39.83	50.8	65.3	
17:15.23	32.52	-83.47	34.87	57.64	58	0.282	0.302		0.0	0.00	0.000	1.215	2.24	7.50	25.64	40.38	50.0	66.3	
17:21.33	32.74	-83.67	0.00	57.72	54	0.267	0.272	AM	0.0	0.00	0.000	0.000	1.81	6.98	22.72	40.56	52.3	62.5	
17:31.47	32.95	-83.91	0.00	57.87	55	0.257	0.261	AM	0.0	0.00	0.000	1.384	2.10	7.19	24.35	40.26	44.6	68.7	
17:41.51	33.16	-84.12	33.34	57.98	52	0.305	0.326	N	0.0	0.00	0.000	0.000	2.08	6.97	25.70	44.02	55.3	70.0	
17:51.11	33.37	-84.33	33.87	58.09	46	0.296	0.316		0.0	0.00	0.000	0.000	1.94	7.69	26.69	42.54	54.2	73.9	
18:01.23	33.58	-84.53	34.47	58.20	46	0.304	0.325		0.0	0.00	0.000	0.000	1.89	6.90	24.90	42.26	51.8	71.2	
18:11.35	33.81	-84.72	35.00	58.34	70	0.315	0.338		0.0	0.00	0.000	0.000	1.88	6.02	23.22	40.53	51.0	64.3	
18:21.47	34.04	-84.91	34.98	58.47	75	0.273	0.293	N	0.0	0.00	0.000	0.000	1.94	7.32	22.93	41.63	52.1	67.2	
18:31.51	34.27	-85.10	35.00	58.61	74	0.293	0.314	N	0.0	0.00	0.000	0.000	1.80	6.95	22.35	45.11	55.2	77.6	
18:41.11	34.49	-85.29	37.00	58.74	89	0.287	0.310		0.0	0.00	0.000	1.457	2.09	7.34	25.74	43.09	50.5	69.6	
18:51.23	34.70	-85.46	37.71	58.86	99	0.246	0.309		0.0	0.00	0.000	1.501	1.78	7.60	25.25	43.70	49.6	69.7	
19:01.35	34.91	-85.64	38.01	58.98	101	0.290	0.314		0.0	0.00	0.000	1.192	2.15	6.51	23.95	41.23	48.1	71.2	
19:11.47	35.12	-85.82	38.30	59.11	97	0.268	0.290	N	0.0	1.06	0.000	1.481	2.16	7.51	24.41	43.14	47.1	69.9	
19:21.51	35.34	-86.00	38.72	59.24	104	0.293	0.317	N	0.0	0.00	0.000	1.282	1.96	7.50	26.52	45.06	51.4	77.2	
19:31.11	35.56	-86.18	38.94	59.37	110	0.309	0.335	N	0.0	0.00	0.000	0.000	1.62	6.20	23.36	40.98	45.4	66.2	
19:41.23	35.73	-86.36	38.98	59.50	121	0.311	0.337		0.0	0.00	0.000	0.000	1.56	6.16	23.11	40.92	50.7	66.1	
19:51.35	35.96	-86.54	38.97	59.64	119	0.325	0.352	T N	0.0	0.00	0.000	0.000	1.83	5.87	24.42	38.28	49.2	70.1	
20:01.46	36.14	-86.74	38.97	59.78	113	0.273	0.295	RT N	0.0	0.00	0.000	2.296	1.91	6.70	23.17	37.91	47.2	55.4	
20:11.58	36.44	-86.91	38.97	59.92	102	0.326	0.353	T	0.0	0.00	0.000	0.000	1.54	6.27	25.39	41.84	52.1	72.4	
20:22.10	36.67	-87.10	38.97	60.07	100	0.290	0.314	N	0.0	0.00	0.000	0.000	1.78	7.04	24.68	44.80	51.5	81.2	
20:32.22	36.95	-87.28	38.97	60.22	98	0.248	0.322	N	0.0	0.00	0.000	1.363	1.76	7.02	25.80	44.54	54.0	77.8	
20:42.34	37.21	-87.46	38.97	60.37	97	0.305	0.330	N	0.0	0.00	0.000	0.000	1.70	7.24	27.23	47.23	60.0	85.2	
20:52.46	37.47	-87.64	38.97	60.56	94	0.297	0.322	N	0.0	0.00	0.000	0.000	2.08	8.40	30.06	60.75	70.4	97.2	
21:02.58	37.74	-87.82	38.97	60.75	96	0.316	0.343	N	0.0	0.00	0.000	0.000	1.92	8.59	33.74	59.37	91.4	116.3	
21:13.10	38.01	-88.00	38.97	60.94	94	0.381	0.412	N	0.0	0.00	0.000	0.000	1.99	7.51	38.02	67.25	84.2	117.3	
21:23.22	38.23	-88.18	38.97	61.14	94	0.352	0.325	N	0.0	0.00	0.000	0.000	2.02	10.76	40.11	71.31	108.1	145.9	
21:33.34	38.54	-88.36	38.95	61.35	96	0.314	0.344	N	0.0	0.00	0.000	0.000	2.47	11.28	46.33	78.55	107.6	139.1	
21:43.46	38.81	-88.54	38.97	61.57	102	0.319	0.345	N	0.0	0.00	0.000	0.000	2.57	11.69	45.40	86.01	133.9	189.7	
21:53.58	39.07	-88.72	38.98	61.79	103	1.339	1.450	RT N	0.0	0.00	0.000	0.000	0.00	3.37	14.13	67.67	99.9	165.1	
22:04.10	39.32	-88.90	38.96	61.90	106	0.292	0.317	N	0.0	0.00	0.000	0.000	2.40	12.19	43.97	78.82	127.8	203.0	
22:14.22	39.58	-89.08	38.97	62.13	106	0.344	0.373	N	0.0	0.00	0.000	0.000	2.23	10.37	42.88	80.94	136.4	242.6	
22:24.34	39.84	-89.26	38.96	62.35	104	0.355	0.395	N	0.0	0.00	0.000	0.000	2.33	10.30	42.49	82.67	138.4	251.6	
22:34.46	40.10	-89.44	38.95	62.57	107	0.377	0.408	N	0.0	0.00	0.000	0.000	1.90	8.72	42.00	79.64	138.4	218.2	
22:44.58	40.36	-89.62	38.95	62.79	115	0.361	0.391	N	0.0	0.00	0.000	0.000	1.81	9.43	38.20	75.16	146.7	217.3	
22:55.10	40.61	-89.80	38.95	63.01	125	0.376	0.408	N	0.0	0.00	0.000	0.000	2.20	9.29	37.91	77.39	137.2	231.5	
23:05.22	40.87	-90.00	38.94	63.23	126	0.335	0.363	N	0.0	0.00	0.142	0.000	2.67	9.80	41.27	75.07	113.7	258.0	
23:15.34	41.12	-90.18	38.92	63.45	128	0.333	0.361	N	0.0	0.00	0.000	0.000	1.48	10.28	42.05	77.77	139.5	236.7	
23:25.46	41.38	-90.36	38.93	63.67	125	0.319	0.344	N	0.0	0.00	0.000	0.000	2.08	10.67	42.20	75.83	142.3	246.0	
23:35.58	41.64	-90.54	38.97	63.89	123	0.364	0.378	RT N	0.0	7.24	0.251	5.178	1.57	4.67	14.83	17.11	16.2	15.3	
23:46.10	41.90	-90.72	38.97	64.11	123	0.352	0.382	N	0.0	0.00	0.000	0.000	1.33	6.62	28.13	55.44	93.4	147.2	
23:56.22	42.16	-90.90	38.97	64.33	120	0.336	0.364	N	0.0	0.00	0.000	0.000	1.91	6.91	31.29	53.97	93.1	163.8	
24:06.34	42.42	-91.08	38.95	64.55	117	0.318	0.344	N	0.0	0.00	0.000	0.000	1.76	7.45	29.77	53.41	87.3	169.9	
24:16.46	42.68	-91.26	38.94	64.77	127	0.327	0.355	N	0.0	0.00	0.000	0.000	1.57	8.24	32.72	61.15	102.8	181.5	
24:26.58	42.94	-91.44	38.94	64.99	125	0.391	0.369	N	0.0	0.00	0.000	0.000	1.65	7.63	35.16	60.22	99.2	181.9	
24:37.10	43.20	-91.62	38.98	65.21	124	0.268	0.291	RT N	0.0	6.77	0.425	4.544	1.99	4.27	16.83	31.92	43.0	59.4	
24:47.22	43.46	-91.80	38.94	65.43	115	0.311	0.337	RT N	0.0	0.00	0.000	0.000	3.54	16.12	61.67	110.62	189.0	378.3	
24:57.34	43.72	-91.98	38.97	65.65	111	0.300	0.326	RT N	0.0	2.84	0.000	0.000	2.44	10.15	41.08	69.21	101.7	160.5	

DATE= 751228		(YR-MO-DAY)		DAY= 342		FLT NO= 6		NASA - GASP - FALL 1975 FLIGHTS																	
THAS		LAT		LONG		PRESS.		SUN		OZONE		OZONE		MEASURED		DOWNWARD		SOLAR FLUX		IN (E-06) W/(CM**2-NM)		WAVELENGTH		IN NM	
HOURS		(DEG)		(DEG)		ALT		ANG		PPB		(ATM-CM)		BB		EE		NB		NF		NB		NB	
(GMT)		N		E		(KFT)		(DEG)																	
1703:39	39.32	-78.48	39.67	63.17	117	0.636	0.691	RT	N	0.0	0.00	0.000	0.000	2.10	12.21	24.12	68.94	186.6	425.2						
1800:43	39.57	-78.29	39.72	63.56	118	0.365	0.396		N	0.0	0.00	0.000	0.000	1.72	8.84	44.03	81.26	152.6	272.8						
1833:1	39.81	-78.03	40.53	63.95	111	0.811	0.881	RT	N	0.0	0.00	0.000	0.000	1.44	7.10	15.73	47.25	163.1	473.7						
1855:13	40.02	-78.04	40.91	64.26	98	0.292	0.317	RT	N	0.0	1.94	0.000	1.409	0.98	4.94	20.69	34.07	39.7	30.7						
1907:24	39.95	-78.31	40.62	64.25	100	0.343	0.372		N	0.0	0.00	0.000	0.000	0.90	4.20	20.79	39.13	52.0	93.5						
1911:36	39.79	-78.54	40.60	64.17	108	0.319	0.346	R	N	0.0	10.73	0.499	0.000	0.92	4.39	19.16	35.24	54.6	102.0						
1911:43	39.60	-78.74	40.21	64.05	103	0.330	0.359		N	0.0	0.00	0.000	0.000	1.09	4.64	22.50	38.45	71.2	101.8						
1913:59	39.40	-78.93	41.00	63.95	101	0.299	0.325		N	0.0	0.00	0.134	0.000	1.24	5.79	23.91	43.09	61.5	99.0						
1916:11	39.21	-79.12	40.99	63.95	104	0.312	0.339		N	0.0	0.00	0.105	0.000	1.57	5.47	22.79	43.87	62.1	101.7						
1918:22	39.02	-79.10	41.00	63.75	105	0.315	0.342		N	0.0	0.00	0.000	0.000	1.24	5.80	25.65	44.81	67.0	105.3						
1920:39	38.83	-79.59	40.39	63.66	104	0.308	0.335		N	0.0	1.68	0.094	0.000	1.40	5.28	22.99	38.14	60.0	95.2						
1922:45	38.63	-79.67	41.00	63.57	104	0.309	0.335		N	0.0	0.00	0.127	0.000	1.44	5.54	22.94	42.58	61.0	99.5						
1924:57	38.44	-79.86	41.70	63.48	102	0.316	0.343		N	0.0	0.00	0.000	0.000	1.29	5.22	22.99	39.33	63.8	102.7						
1927:9	38.25	-80.04	41.00	63.39	107	0.320	0.348		N	0.0	0.00	0.121	0.000	1.16	5.52	23.83	43.62	70.3	102.3						
1927:21	38.05	-80.22	41.00	63.30	108	0.307	0.333		N	0.0	0.00	0.000	0.000	1.28	6.08	24.93	44.51	66.4	118.1						
1931:32	37.86	-80.40	41.00	63.22	108	0.304	0.330		N	0.0	0.00	0.091	0.000	1.46	6.27	25.55	44.38	74.1	123.8						
1933:44	37.68	-80.58	41.00	63.13	115	0.310	0.337		N	0.0	0.00	0.000	0.000	1.25	6.39	27.90	44.23	76.4	125.0						
1935:55	37.46	-80.77	40.79	63.04	115	0.330	0.359		N	0.0	0.00	0.000	0.000	1.47	5.87	25.49	46.90	73.3	127.7						
1937:7	37.26	-80.96	41.00	62.95	114	0.316	0.344	R	N	0.0	0.00	0.000	0.000	1.47	5.92	25.55	46.51	70.0	57.4						
1940:13	37.20	-81.20	40.38	63.00	114	0.363	0.395	RT	N	0.0	0.00	0.000	0.000	1.33	7.21	33.90	63.09	116.4	206.6						
1942:33	37.32	-81.47	41.00	63.18	118	0.235	0.256	R	N	0.0	5.23	0.144	2.761	1.42	4.45	15.43	28.05	32.0	38.8						
1944:42	37.37	-81.77	41.00	63.31	125	0.312	0.340		N	0.0	0.00	0.000	0.000	1.51	7.16	29.11	51.50	100.0	168.4						
1948:53	37.43	-82.07	40.39	63.45	138	0.327	0.356		N	0.0	0.00	0.000	0.000	1.63	6.95	31.78	55.15	88.6	151.1						
1949:5	37.50	-82.39	41.00	63.58	139	0.321	0.350		N	0.0	0.00	0.000	0.000	1.29	7.48	30.25	58.89	92.1	156.5						
1951:15	37.56	-82.69	41.00	63.71	146	0.270	0.294		N	0.0	0.00	0.000	0.000	1.12	7.10	27.90	13.38	121.7	3.6						
1953:23	37.62	-82.99	40.98	63.83	141	0.339	0.370		N	0.0	0.00	0.000	0.000	1.43	6.67	26.99	54.27	95.9	149.4						
1955:34	37.68	-83.22	40.96	63.96	130	0.286	0.311		N	0.0	0.00	0.000	0.000	1.76	8.24	31.61	56.35	94.6	147.6						
1957:40	37.73	-83.64	40.77	64.09	134	0.335	0.365		N	0.0	0.00	0.000	0.000	1.26	6.61	28.58	57.21	96.0	132.7						
1959:57	37.81	-83.92	40.99	64.22	138	0.305	0.333		N	0.0	0.00	0.000	0.000	1.50	6.68	28.71	49.86	84.1	147.4						
1962:9	37.87	-84.28	40.99	64.35	143	0.313	0.342		N	0.0	0.00	0.000	0.000	1.26	6.45	29.02	50.62	87.4	132.7						
1964:29	37.93	-84.60	41.00	64.47	144	0.323	0.352		N	0.0	0.00	0.000	0.000	0.98	6.35	26.57	49.99	98.1	151.1						
1966:32	37.99	-84.91	41.93	64.60	141	0.322	0.351		N	0.0	0.00	0.000	0.000	1.59	5.86	27.87	48.28	80.1	135.2						
1968:44	38.05	-85.25	40.99	64.73	138	0.328	0.357		N	0.0	0.00	0.000	0.000	1.06	5.84	26.90	50.28	80.4	143.3						
1969:53	38.04	-85.56	41.01	64.83	139	0.191	0.197	RT	N	0.0	0.42	0.020	6.719	2.05	6.11	18.10	15.28	8.2	8.2						
1971:7	38.07	-85.72	40.98	64.93	144	0.298	0.324	R	N	0.0	0.00	0.000	0.000	1.00	4.79	20.65	35.75	58.5	92.7						
1973:18	38.18	-85.86	40.99	64.69	145	0.284	0.309		N	0.0	0.00	0.000	0.000	1.17	6.14	24.36	43.09	72.7	110.1						
1975:33	38.33	-85.99	40.98	64.61	147	0.301	0.329		N	0.0	0.00	0.000	0.000	1.07	6.11	27.26	44.78	78.7	120.2						
1977:47	38.43	-86.13	40.95	64.54	148	0.313	0.341		N	0.0	0.00	0.090	0.000	1.21	6.25	26.40	50.66	75.8	130.7						
1979:53	38.58	-86.27	40.75	64.46	148	0.304	0.332		N	0.0	0.00	0.000	0.000	1.23	5.72	24.50	43.55	71.7	119.0						
1981:5	38.64	-86.40	40.96	64.40	147	0.311	0.339		N	0.0	0.00	0.000	0.000	0.97	5.07	19.56	39.02	65.6	100.4						
1983:16	38.69	-86.54	40.98	64.33	147	0.310	0.338		N	0.0	0.00	0.000	0.000	1.12	4.98	21.43	39.14	62.9	97.5						
1985:28	38.74	-86.57	41.01	64.27	146	0.317	0.345	RT	N	0.0	1.81	0.130	1.065	1.07	4.49	20.94	32.46	48.1	56.9						
1987:33	38.91	-86.53	40.98	64.31	146	0.331	0.361	R	N	0.0	0.00	0.000	0.000	0.74	5.24	21.20	43.00	75.7	109.2						
1989:51	39.01	-86.33	40.99	64.45	142	0.306	0.334	R	N	0.0	10.67	0.404	2.443	1.44	5.33	23.43	40.86	61.7	107.1						
1991:2	39.07	-86.12	40.96	64.55	143	0.284	0.309		N	0.0	0.00	0.078	0.000	0.99	5.43	21.71	37.35	64.0	104.4						
1993:14	39.23	-85.92	40.95	64.66	140	0.307	0.335		N	0.0	0.00	0.000	0.000	1.05	5.33	20.59	40.33	66.0	115.4						
1995:23	39.29	-85.72	40.95	64.78	137	0.300	0.327		N	0.0	0.00	0.089	0.000	1.00	5.26	22.98	39.56	63.7	110.3						
1997:37	39.43	-85.51	40.95	64.90	131	0.295	0.321		N	0.0	0.00	0.000	0.000	1.31	5.56	24.59	40.11	66.5	116.6						
1999:49	39.50	-85.31	40.94	65.04	129	0.299	0.315		N	0.0	0.00	0.000	0.000	1.20	5.73	24.83	40.45	67.6	117.6						

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751210 (YR-MO-DAY)				DAY= 344		FLT NO= 7		NASA - GASP - FALL 1975 FLIGHTS													
LAT		LONG		PRESS		SUN		OZONE		OZONE		MEAS		TOTAL		DOWNWARD		SOLAR FLUX IN (E-06) W/(CM**2-NM)		WAVELENGTH IN NM	
(MT)	(N)	(E)	(KT)	(DUG)	(ATM-CF)	BB	FB	NB	NR	NB	NB	BB	FB	NB	NR	BB	FB	NB	NB	BB	FB
1448:12	27.80	-79.50	32.98	57.62	219	0.290	0.315	N	0.0	1.42	0.000	2.064	2.49	7.81	28.24	45.70	50.3	81.5			
1453:24	30.08	-79.51	33.09	58.08	233	0.341	0.372	RT N	0.0	0.00	0.000	0.000	1.21	9.34	36.95	65.06	88.0	128.6			
1458:36	30.19	-79.59	34.66	58.33	240	0.115	0.125	RT N	0.0	6.20	0.254	5.634	2.74	7.57	20.51	26.85	17.9	11.8			
1454:47	27.97	-79.78	37.38	58.33	215	0.295	0.321	R N	0.0	0.00	0.000	0.000	3.74	12.38	40.25	76.30	104.1	161.2			
1459:59	29.70	-79.78	38.62	58.32	136	0.115	0.341	R N	0.0	0.00	0.000	0.000	3.90	11.65	42.68	72.76	104.6	194.5			
1451:11	29.46	-79.82	39.01	58.31	135	0.131	0.143	RT N	0.0	18.30	1.199	8.168	2.82	7.71	20.21	33.61	40.9	50.5			
1501:23	27.43	-80.05	38.83	58.43	131	0.134	0.145	R N	0.0	15.76	1.057	14.352	9.50	25.05	20.96	32.22	39.7	469.6			
1501:34	29.55	-80.27	39.00	58.67	124	0.067	0.073	RT N	0.0	23.16	1.397	16.453	9.63	27.36	22.10	33.09	42.8	62.7			
1505:46	29.30	-80.37	39.98	59.69	124	0.301	0.326	R N	0.0	0.00	0.000	0.000	2.66	7.76	30.08	53.33	62.2	81.0			
1507:53	30.10	-80.37	39.00	59.58	141	0.232	0.251	R N	0.0	6.09	0.251	5.292	3.37	11.13	38.63	43.38	32.5	29.0			
1511:1	30.38	-80.24	39.00	60.11	239	0.275	0.301	RT N	0.0	0.00	0.000	0.000	2.74	9.49	32.48	57.16	72.4	92.8			
1512:21	30.61	-80.03	39.01	60.66	133	0.819	0.454	RT N	0.0	0.00	0.000	0.000	0.64	6.22	33.35	66.95	92.4	144.8			
1514:33	30.54	-79.76	39.99	60.98	162	0.265	0.289	PT N	0.0	7.35	0.253	4.925	1.82	2.05	8.21	15.55	17.9	58.7			
1516:44	30.29	-79.80	38.99	61.00	134	0.318	0.345	R N	0.0	0.00	0.000	0.000	2.29	9.79	39.65	65.37	108.5	209.2			
1518:56	30.10	-80.01	39.00	61.01	122	0.317	0.343	N	0.0	0.00	0.000	0.000	2.66	10.12	38.20	69.21	122.8	177.7			
1521:8	29.92	-80.21	39.00	61.03	120	0.296	0.320	N	0.0	0.00	0.000	0.000	2.96	9.87	35.47	62.08	107.6	161.8			
1523:20	27.76	-80.41	39.01	61.06	158	0.368	0.400	RT N	0.0	6.07	0.434	3.352	2.15	5.14	27.64	39.17	39.3	115.6			
1525:31	29.74	-80.67	39.00	61.19	193	0.457	0.499	R N	0.0	0.00	0.000	0.000	0.58	3.55	23.77	92.79	60.3	25.5			
1527:43	29.81	-80.90	39.03	61.41	173	0.261	0.284	RT N	0.0	0.00	0.000	0.000	1.20	3.91	15.22	23.63	56.0	272.1			
1531:55	30.01	-80.71	38.99	61.33	196	0.202	0.220	RT N	0.0	2.34	0.169	4.615	2.36	7.22	21.82	28.66	25.2	22.8			
1532:6	31.02	-80.32	39.00	62.42	126	0.315	0.341	N	0.0	0.00	0.000	0.000	2.75	12.13	47.38	86.19	148.5	256.8			
1534:18	27.99	-79.95	39.00	62.16	118	0.051	0.056	RT N	0.0	3.34	0.413	9.524	3.14	4.64	8.64	14.49	15.4	20.4			
1536:31	27.89	-79.67	39.02	63.15	122	0.397	0.213	RT N	0.0	0.00	0.000	0.000	3.19	9.71	31.88	42.07	26.8	9.4			
1538:42	27.66	-79.77	38.98	63.28	129	0.283	0.307	PT N	0.0	0.00	0.000	0.000	1.80	7.45	26.95	50.14	78.0	119.0			
1540:53	27.69	-80.04	39.00	63.46	125	0.338	0.366	PT N	0.0	0.00	0.000	0.000	0.99	4.16	18.92	34.26	63.7	105.7			
1543:5	29.85	-80.26	38.99	63.76	170	0.285	0.310	N	0.0	0.00	0.000	0.000	1.62	8.52	29.70	56.60	96.8	153.2			
1545:17	30.03	-80.47	39.01	64.08	175	0.208	0.227	RT N	0.0	3.87	0.211	3.030	2.08	7.18	14.60	31.62	42.2	42.4			
1547:29	30.29	-80.59	38.98	64.51	190	0.261	0.285	R N	0.0	16.42	0.231	0.000	1.39	5.79	21.96	37.37	55.2	31.9			
1549:47	30.51	-80.56	39.02	65.01	194	0.329	0.359	PRT N	0.0	0.00	0.000	0.000	5.24	30.74	154.97	126.81	100.7	642.2			

DATE=	751214	(YR-MO-DAY)	DAY=	348	FLT NO=	9	NASA - GASP - FALL 1975 FLIGHTS															
PPAP	LAT	LONG	PRESS	SUN	03	MPAS	TOTAL	QCCQQQ	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9				
HHMMSS	(DEG)	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	CZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM))										WAVELENGTH IN NM			
(.SS)	(N)	(E)	(KFT)	(DEG)			(ATM-CM)		BE	BE	NR	NR	NR	NR	NR	NR	NR	NR	NR			
1551.32	28.63	-80.28	12.50	54.93	30	0.242	0.248	A	0.0	0.00	0.000	1.336	3.17	8.97	27.44	47.41	55.4	74.5				
1601.44	28.80	-80.12	16.12	54.86	37	0.232	0.239	A	0.0	0.00	0.000	1.681	3.55	10.14	27.27	47.56	54.9	82.7				
1601.57	28.98	-79.95	19.79	54.82	45	0.228	0.237	A	0.0	0.00	0.000	1.497	3.78	10.65	28.78	47.19	56.1	77.2				
1606.3	29.17	-79.78	22.97	54.78	35	0.222	0.232		0.0	0.00	0.000	1.690	4.22	11.11	30.49	49.98	60.2	83.5				
1608.21	29.36	-79.59	25.74	54.76	32	0.218	0.229		0.0	0.00	0.000	2.140	4.55	11.65	32.37	52.56	60.5	87.7				
1610.24	29.56	-79.40	27.77	54.75	37	0.238	0.251		0.0	0.00	0.000	2.685	4.57	13.34	36.06	57.49	63.9	88.9				
1612.46	29.77	-79.20	29.50	54.76	41	0.231	0.244		0.0	0.00	0.000	2.051	4.61	12.65	34.33	55.93	64.3	97.3				
1614.53	29.98	-78.98	31.14	54.78	99	0.278	0.297	RT M	0.0	0.00	0.000	2.256	5.88	19.86	60.43	94.32	53.5	76.5				
1617.11	30.09	-78.66	32.51	54.68	171	0.223	0.241		0.0	0.00	0.000	2.619	4.85	12.66	35.14	54.66	63.2	87.1				
1618.23	30.20	-78.37	33.03	54.61	35	1.416	1.509	RT M	0.0	0.00	0.000	0.000	0.00	5.95	35.52	137.72	333.4	779.3				
1621.35	30.34	-78.52	32.97	54.67	36	0.270	0.288	RT M	0.0	0.00	0.000	0.000	3.71	9.94	26.51	49.12	75.6	125.2				
1623.49	30.34	-78.80	31.00	54.62	34	0.224	0.239	R M	0.0	2.06	0.066	2.235	3.87	10.03	27.92	42.28	53.1	66.9				
1626.3	30.25	-79.11	31.01	54.48	34	0.228	0.243	M	0.0	0.00	0.000	1.789	4.10	11.02	29.23	48.22	58.0	78.9				
1628.12	30.16	-79.41	33.00	54.35	35	0.227	0.242		0.0	0.00	0.000	2.256	4.42	11.95	31.83	51.28	59.1	82.1				
1631.25	30.06	-79.71	33.00	54.21	34	0.236	0.252	M	0.0	0.00	0.000	2.145	4.12	11.79	30.88	51.36	57.4	76.8				
1632.37	29.97	-80.01	33.00	54.07	36	0.219	0.233		0.0	0.00	0.000	2.183	4.69	12.01	32.00	49.29	57.5	84.5				
1634.47	29.87	-80.21	33.01	53.93	37	0.223	0.248		0.0	0.00	0.000	2.153	4.41	12.56	31.42	48.58	62.6	77.2				
1637.1	29.78	-80.60	33.00	53.80	36	0.239	0.254	M	0.0	1.38	0.000	2.513	4.01	11.15	30.59	49.42	55.9	77.7				
1639.14	29.62	-80.90	33.00	53.66	38	0.230	0.246	R	0.0	2.43	0.000	2.629	4.58	11.76	32.39	52.12	64.0	88.6				
1641.26	29.59	-81.19	33.01	53.53	36	0.221	0.235		0.0	0.00	0.000	3.077	5.12	13.26	33.70	54.26	62.3	96.0				
1643.34	29.55	-81.48	33.01	53.44	38	0.256	0.273	RT M	0.0	0.00	0.000	0.000	9.64	29.22	75.92	127.70	187.4	271.5				
1645.50	29.67	-81.74	33.00	53.32	37	0.191	0.204	R N	0.0	0.00	0.000	2.902	5.72	13.27	34.69	58.96	72.2	9.2				
1648.2	29.64	-81.83	33.00	53.62	36	0.202	0.215	RT	0.0	0.00	0.164	6.875	9.01	23.72	58.79	35.53	57.3	82.3				
1650.14	29.47	-81.52	33.00	53.53	38	0.202	0.215	RT M	0.0	5.33	0.213	4.632	4.89	12.18	30.20	45.82	54.2	72.0				
1652.26	29.74	-81.19	33.00	53.29	38	0.219	0.233		0.0	0.00	0.000	2.733	5.38	13.49	35.77	59.20	68.2	89.7				
1654.31	29.57	-80.89	33.01	53.03	39	0.210	0.224	RT	0.0	6.16	0.231	4.651	5.15	12.63	33.21	50.97	60.4	79.8				
1656.51	29.28	-80.75	33.03	52.68	36	0.098	0.062	RT M	0.0	16.97	0.950	15.001	7.84	9.08	18.88	27.12	25.5	28.1				
1659.3	29.05	-80.95	32.97	52.56	37	0.219	0.233	RT M	0.0	0.00	0.000	3.246	6.41	16.28	44.38	71.14	78.0	22.4				
1701.13	28.36	-81.17	33.00	52.69	36	0.290	0.256	R M	0.0	0.00	0.000	2.160	5.53	14.82	40.82	64.95	81.7	101.5				
1703.27	29.61	-81.26	33.01	52.31	37	0.226	0.241		0.0	0.00	0.089	2.843	5.24	13.71	35.60	54.76	65.4	91.4				
1705.33	29.86	-81.34	33.02	53.13	36	0.357	0.380	RT	0.0	0.00	0.000	2.611	2.45	11.82	41.30	53.61	62.2	89.7				
1707.51	30.11	-81.22	33.00	53.14	35	0.227	0.242		0.0	0.00	0.000	2.783	4.87	12.57	34.05	54.05	63.1	86.3				
1711.3	30.28	-81.00	33.03	53.47	35	0.171	0.183	RT M	0.0	3.74	0.244	6.653	6.06	14.35	32.35	44.71	39.5	45.3				
1712.15	30.05	-80.91	32.94	53.22	35	0.268	0.286	RT M	0.0	0.00	0.000	0.000	4.21	12.32	37.35	58.41	70.7	96.3				
1714.27	29.77	-81.36	33.01	52.94	35	0.238	0.253		0.0	0.00	0.000	2.439	4.60	12.38	33.96	54.47	64.0	79.9				
1716.33	29.50	-81.21	33.02	52.67	35	0.070	0.075	RT M	0.0	6.22	0.324	8.321	6.47	14.60	38.43	41.24	11.8	9.5				
1718.51	29.33	-81.45	32.98	52.49	36	0.230	0.245		0.0	0.00	0.000	2.667	5.00	12.85	33.73	55.41	64.4	92.0				
1721.3	29.30	-81.72	33.03	52.46	36	1.467	1.563	RT M	0.0	0.00	0.000	0.000	1.48	7.95	34.34	130.67	351.2	608.5				
1723.15	29.54	-81.66	33.00	52.70	37	0.294	0.314	RT M	0.0	0.00	0.000	0.000	4.56	14.84	44.77	80.62	96.9	127.4				
1725.27	29.69	-81.38	32.99	52.87	37	0.223	0.238	R	0.0	1.73	0.084	2.546	5.29	13.58	35.32	56.69	68.5	91.9				
1727.33	29.79	-81.04	32.94	53.00	35	0.201	0.215	R M	0.0	2.90	0.141	8.451	5.79	14.69	38.05	57.31	49.2	73.5				
1729.51	29.81	-80.70	32.99	53.06	36	0.273	0.291	RT	0.0	6.00	0.100	0.000	3.66	9.77	27.16	54.88	69.5	92.6				
1732.2	29.61	-80.47	33.02	52.91	35	0.812	0.865	RT N	0.0	5.76	0.197	2.076	2.14	3.38	7.49	21.66	63.3	90.5				
1734.14	29.42	-80.67	33.01	52.74	37	1.287	1.372	RT N	0.0	8.22	0.000	0.000	1.72	6.37	18.50	61.55	240.5	548.2				
1736.27	29.49	-80.95	33.00	52.83	37	0.218	0.232		0.0	0.00	0.000	2.802	5.15	12.49	33.78	53.31	62.7	84.2				
1738.33	29.60	-81.22	33.00	52.96	37	0.223	0.238	M	0.0	0.00	0.000	2.009	4.40	11.09	29.80	45.22	55.9	74.8				
1740.22	29.73	-81.46	33.01	53.12	35	0.735	0.763	RT M	0.0	0.00	0.000	0.000	0.81	3.28	37.59	64.88	79.4	117.9				
1743.2	29.97	-81.57	33.00	53.39	36	0.211	0.225		0.0	0.00	0.000	2.903	5.06	12.31	32.30	52.38	59.0	86.1				
1745.14	30.19	-81.54	33.03	53.67	34	0.257	0.274	RT M	0.0	0.00	0.000	2.555	5.34	16.18	45.11	70.22	68.9	46.2				
1747.26	30.07	-81.28	32.99	53.65	37	0.210	0.224	RT M	0.0	5.14	0.166	4.590	4.77	12.35	31.24	43.60	52.8	73.3				
1749.33	29.77	-81.16	33.01	53.44	38	0.247	0.263		0.0	0.00	0.070	2.375	4.21	11.92	33.23	50.95	59.2	86.6				
1751.53	29.47	-81.05	33.01	53.23	38	0.841	0.896	RT	0.0	1.53	0.000	3.127	4.97	9.31	11.93	49.54	62.0	80.6				
1753.2	29.14	-81.34	33.01	53.01	36	0.063	0.067	RT M	0.0	6.03	0.330	6.482	5.04	15.48	39.44	54.22	10.6	10.2				
1755.14	29.11	-81.36	32.94	53.00	35	0.289	0.308	RT M	0.0	0.00	0.000	0.000	13.40	42.61	110.72	192.57	352.9	629.3				
1757.26	29.34	-81.45	33.01	53.10	37	0.231	0.246	RT N	0.0	0.00	0.000	1.981	5.33	13.87	37.36	58.96	73.4	101.9				
1800.37	29.60	-81.32	32.99	53.67	38	0.233	0.248	T	0.0	0.00	0.000	2.844	4.98	13.20	36.84	57.74	65.1	92.8				

DATE=	751214	(YR-MO-DAY)	DAY=	348	FLT NO=	9	NASA - GASP - FALL 1975 FLIGHTS													
TIME	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	QCCQ	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9		
HHMMSS	(DEG)	(DEG)	ALT	ANG	PPB	OZONE	OZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)	BB	EP	NE	NE	NE	NE	NE	NE	NE	NE	BB	
(MST)	(N)	(E)	(KFT)	(DEG)		(ATH-CE)														
1302 49	29.86	-81.18	33.00	54.05	36	0.273	0.291	RT M	0.0	0.00	0.000	0.000	4.69	12.22	32.89	61.12	94.6	151.6		
1303 1	29.94	-80.90	32.97	54.24	39	0.299	0.318	RT M	0.0	0.00	0.000	0.000	3.50	10.60	36.64	60.35	67.4	100.1		
1307 13	29.76	-80.05	33.00	54.28	35	0.234	0.249	RT M	0.0	5.69	0.219	3.286	3.72	9.17	28.12	42.78	51.8	67.4		
1307 25	29.45	-80.06	33.02	54.09	36	0.062	0.067	RT M	0.0	10.88	0.590	12.288	8.58	9.11	15.35	23.61	20.0	20.6		
1311 37	29.34	-80.46	32.99	54.16	37	0.581	0.619	RT M	0.0	0.00	0.000	0.000	6.56	23.74	44.57	110.63	272.9	522.1		
1311 49	29.58	-80.37	32.99	54.54	36	0.241	0.257	R	0.0	0.00	0.000	2.106	4.08	11.66	32.26	53.45	61.7	81.2		
1316 51	29.84	-80.37	33.01	54.93	35	0.256	0.273	T	0.0	0.00	0.000	2.036	3.65	10.73	32.48	47.33	59.3	82.8		
1318 12	30.10	-80.37	33.02	55.32	34	0.211	0.225	RT N	0.0	3.75	0.197	5.183	6.15	15.31	44.11	22.15	56.4	134.9		
1320 24	30.33	-80.21	32.99	55.73	37	0.234	0.249		0.0	0.00	0.000	1.687	3.80	10.68	29.58	49.42	59.4	80.2		
1322 36	30.59	-79.95	33.04	56.11	34	0.285	0.304	RT M	0.0	0.00	0.000	0.000	4.19	15.24	47.59	83.49	100.2	120.6		
1324 43	30.32	-79.81	32.98	56.14	37	0.382	0.407	RT M	0.0	2.54	0.165	2.299	1.77	3.70	11.89	26.02	42.1	71.8		
1327 5	30.11	-80.01	33.01	56.03	37	0.233	0.248	M	0.0	0.00	0.000	1.626	3.21	8.22	25.42	39.67	47.9	61.2		
1327 12	29.87	-80.25	33.01	55.93	36	0.242	0.258	M	0.0	0.00	0.000	1.883	3.08	9.23	26.04	38.56	43.5	60.4		
1331 23	29.74	-80.50	33.01	55.88	38	0.291	0.310	RT M	0.0	0.00	0.000	0.000	8.80	24.33	71.86	123.23	254.8	394.1		
1333 35	29.75	-80.40	33.02	55.96	36	0.662	0.066	RT M	0.0	5.76	0.278	6.590	4.93	13.05	37.83	60.15	20.2	13.4		
1335 47	29.87	-80.95	32.99	56.21	38	0.264	0.251	RT M	0.0	0.00	0.000	0.000	11.69	31.06	84.62	144.88	255.1	509.9		
1337 53	30.02	-80.69	33.00	56.61	36	0.193	0.206	RT M	0.0	7.43	0.321	6.616	5.89	15.21	38.74	59.78	68.2	99.5		
1340 11	30.02	-80.33	33.01	56.91	37	0.735	0.250	T M	0.0	0.00	0.000	2.021	3.32	9.73	28.13	41.65	50.6	70.8		
1342 23	29.93	-79.97	33.01	57.20	38	0.181	0.193	RT M	0.0	0.00	0.000	0.662	24.940	19.71	46.18	51.28	87.19	146.1	216.0	
1344 35	29.79	-79.69	33.03	57.33	37	0.317	0.338	RT M	0.0	0.00	0.000	0.000	12.80	58.87	151.13	211.85	260.0	259.2		
1346 46	29.61	-79.78	32.98	57.33	39	0.210	0.224	RT M	0.0	0.00	0.000	0.000	8.88	22.77	65.95	116.22	176.1	55.4		
1348 53	29.67	-80.05	33.00	57.49	37	0.292	0.311	M	0.0	0.00	0.000	0.000	6.49	20.77	64.92	116.91	166.3	332.1		
1351 12	29.85	-80.26	33.03	57.74	37	0.221	0.236	M	0.0	0.00	0.000	1.634	3.31	8.72	25.53	42.64	51.3	70.5		
1351 22	30.03	-80.47	33.03	58.07	35	0.108	0.116	PT N	0.0	14.73	0.899	14.196	10.33	30.86	23.37	36.10	48.0	58.7		
1353 34	30.28	-80.52	32.97	58.48	37	0.226	0.240		0.0	0.00	0.000	1.736	3.24	9.43	27.19	42.84	54.8	70.7		
1357 46	30.50	-80.42	33.04	58.94	36	0.273	0.291	RT M	0.0	0.00	0.000	0.000	2.87	10.90	34.44	58.47	64.7	25.4		
1359 57	30.33	-80.21	32.99	59.10	36	0.170	0.181	RT N	0.0	6.74	0.234	3.444	2.63	5.86	17.70	25.19	25.5	38.5		
1402 7	30.02	-80.20	33.01	59.05	37	0.230	0.254	N	0.0	0.00	0.000	2.058	2.94	9.37	27.70	44.80	56.2	79.6		
1404 21	29.70	-80.19	33.02	59.01	37	0.168	0.179	RT N	0.0	11.79	0.557	8.781	3.06	6.97	18.11	31.56	37.9	50.3		
1407 33	29.58	-79.36	33.57	59.24	37	0.283	0.302	RT M	0.0	0.00	0.000	0.000	6.85	23.41	78.40	125.91	255.4	512.9		
1409 45	29.72	-79.67	34.43	59.73	35	0.279	0.299	RT	0.0	0.00	0.000	1.809	2.80	11.10	37.49	42.20	51.6	63.7		
1410 57	29.82	-79.37	34.50	60.20	34	0.237	0.255	M	0.0	0.00	0.000	1.717	3.05	10.14	29.92	50.26	58.6	77.5		
1413 5	29.92	-79.07	34.01	60.68	33	0.227	0.245	R N	0.0	2.04	0.000	0.000	4.59	12.95	37.60	64.26	90.3	153.3		
1415 23	30.01	-78.76	34.96	61.16	34	0.265	0.286	N	0.0	0.00	0.000	0.000	5.38	14.98	53.63	80.43	135.8	206.1		
1417 33	30.11	-78.44	34.94	61.66	35	0.257	0.277	N	0.0	0.00	0.000	0.000	5.05	17.30	54.29	96.29	149.8	244.0		
1418 44	30.20	-78.12	34.95	62.16	36	0.266	0.287	T N	0.0	0.00	0.000	0.000	4.55	15.47	53.07	87.77	158.3	259.9		
1421 55	30.31	-77.81	34.91	62.67	40	1.524	1.645	RT M	0.0	0.00	0.000	0.000	1.23	2.91	15.24	89.96	334.9	886.5		
1424 7	30.48	-77.82	35.16	63.08	44	1.194	1.288	RT M	0.0	0.00	0.000	0.000	0.00	1.62	10.89	46.33	71.7	107.3		
1427 13	30.51	-78.09	35.00	63.25	40	0.229	0.248	R N	0.0	7.47	0.188	1.681	1.90	5.87	19.37	31.70	43.5	58.4		
1431 31	30.42	-78.39	34.91	63.31	36	0.253	0.273	N	0.0	0.00	0.000	0.000	2.35	7.13	22.87	42.78	67.2	102.9		
1433 42	30.34	-78.69	34.93	63.36	36	0.271	0.292	N	0.0	0.00	0.000	0.000	2.47	6.41	24.30	41.97	63.1	112.0		
1435 54	30.25	-78.99	34.99	63.42	35	0.252	0.272	N	0.0	0.00	0.000	0.000	1.94	6.50	22.72	36.17	64.2	92.5		
1437 5	30.17	-79.29	34.90	63.48	36	0.268	0.289	N	0.0	0.00	0.000	0.000	2.08	6.88	25.54	41.68	66.8	112.5		
1437 18	30.09	-79.59	34.90	63.54	35	0.236	0.254	N	0.0	0.00	0.082	0.000	2.56	7.10	23.79	37.77	67.2	108.1		
1439 23	29.99	-79.49	34.91	63.60	38	0.238	0.257	N	0.0	0.00	0.118	0.000	2.18	7.70	22.07	42.27	60.5	105.8		
1441 31	29.90	-80.19	34.90	63.66	39	0.247	0.266	N	0.0	0.00	0.102	0.000	1.99	7.59	26.22	40.97	64.2	108.3		
1443 53	29.81	-80.49	34.93	63.72	38	0.254	0.274	N	0.0	0.00	0.000	0.000	2.34	7.27	25.99	42.60	64.0	115.7		
1446 4	29.72	-80.78	34.97	63.79	34	0.263	0.283	M	0.0	0.00	0.103	0.000	2.29	6.70	24.52	41.88	63.8	111.6		
1448 16	29.63	-81.08	34.98	63.85	35	0.258	0.279	N	0.0	0.00	0.000	0.000	2.09	7.01	25.02	42.28	61.1	116.9		
1450 23	29.54	-81.37	34.92	63.92	35	0.576	0.621	RT N	0.0	0.00	0.000	0.000	1.13	4.63	15.33	93.41	59.8	33.9		
1452 31	29.32	-81.46	33.98	64.01	37	0.239	0.258	RT N	0.0	0.00	0.096	0.000	2.01	7.05	21.98	41.50	57.7	92.1		
1454 41	29.04	-81.34	33.01	64.16	34	0.235	0.254	N	0.0	0.00	0.082	0.000	2.03	7.60	23.39	42.29	66.5	101.2		
1457 3	28.76	-81.21	33.02	64.33	34	0.211	0.227	R N	0.0	2.50	0.142	1.536	2.35	6.40	22.72	39.25	41.9	49.6		
1459 14	28.62	-80.99	33.01	64.65	35	0.437	0.471	RT N	0.0	0.00	0.000	0.000	1.13	8.66	65.70	44.13	77.5	117.9		
2201 26	28.83	-80.88	33.00	65.20	34	0.176	0.189	RT M	0.0	0.00	0.127	4.415	3.30	9.73	32.01	39.94	40.8	35.6		

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751215 (YR-MO-DAY)			DAY= 349			PLT NO= 10			NASA - GAGP - FALL 1975 FLIGHTS													
FBAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	QCQQQ	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9				
HH:MM:SS	(DEG)	(DEG)	ALT	AVG	EPD	OZONE	CZONE	(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM))														
(-)	(N)	(S)	(KFT)	(DEG)		(ATM-CM)		BB	BB	NR	NR	NR	NR	NR	NR	NR	BB	BB	BB			
1701:55	28.77	-80.25	14.85	54.98	15	0.243	0.250	AN	0.0	0.00	0.000	0.000	3.61	10.72	30.58	49.91	70.2	91.2				
1703:55	28.95	-80.08	18.64	54.92	32	0.243	0.252	AN	0.0	0.00	0.000	1.765	3.98	11.40	33.24	56.77	68.5	90.9				
1706:04	29.13	-79.89	21.66	54.87	36	0.242	0.252	M	0.0	0.00	0.000	2.010	4.12	12.06	34.71	55.03	63.7	93.0				
1708:20	29.32	-79.69	24.57	54.85	38	0.237	0.248		0.0	1.73	0.000	2.883	4.31	12.58	34.45	54.13	60.8	93.7				
1710:12	29.51	-79.49	26.93	54.83	37	0.225	0.237	M	0.0	0.00	0.000	1.879	5.01	12.67	37.19	59.80	69.9	93.5				
1712:45	29.73	-79.28	28.60	54.84	39	0.231	0.245	N	0.0	0.00	0.000	2.416	4.06	13.58	37.29	55.02	70.5	92.4				
1714:57	29.95	-79.05	30.12	54.86	42	0.224	0.237		0.0	0.00	0.000	2.349	4.58	12.58	33.10	47.96	60.0	80.9				
1717:00	30.16	-78.81	32.59	54.88	45	0.193	0.205	RT M	0.0	0.00	0.055	2.926	7.11	17.50	29.64	40.61	45.5	63.7				
1719:22	30.28	-78.50	33.05	54.81	41	0.257	0.274	RT M	0.0	21.84	1.185	17.684	4.96	8.99	24.25	39.66	53.0	328.2				
1721:34	30.40	-78.57	32.92	54.83	39	0.156	0.166	RT M	0.0	5.29	0.260	4.928	4.55	9.85	23.72	35.40	36.6	52.1				
1723:45	30.32	-78.68	32.98	54.70	46	0.231	0.246		0.0	0.00	0.000	1.625	4.04	10.90	29.63	49.92	61.6	74.9				
1725:54	30.23	-79.18	32.99	54.56	42	0.230	0.245		0.0	0.00	0.000	2.552	4.15	10.74	30.79	52.22	58.0	81.9				
1728:11	30.13	-79.48	32.98	54.42	42	0.228	0.243		0.0	0.00	0.000	2.191	4.55	11.53	33.60	52.68	58.2	86.0				
1730:23	30.04	-79.78	32.98	54.28	45	0.217	0.231		0.0	0.00	0.000	2.465	5.07	13.23	33.94	55.08	66.0	86.7				
1732:35	29.95	-80.08	32.98	54.14	45	0.247	0.264		0.0	0.00	0.000	2.648	4.29	13.12	33.76	56.21	65.0	86.9				
1734:47	29.85	-80.37	32.98	54.01	45	0.233	0.249		0.0	0.00	0.000	2.582	4.40	11.95	32.72	54.26	57.9	84.6				
1736:59	29.76	-80.67	32.99	53.87	45	0.246	0.263		0.0	0.00	0.000	2.166	4.38	12.45	35.13	55.05	67.7	86.1				
1739:11	29.66	-80.97	32.98	53.73	48	0.239	0.255		0.0	0.00	0.000	1.964	4.73	13.24	35.91	56.71	66.6	92.9				
1741:24	29.57	-81.26	32.98	53.60	46	0.230	0.246	R M	0.0	0.00	0.000	2.462	4.49	11.62	32.85	52.61	59.5	74.3				
1743:36	29.37	-81.55	32.98	53.56	48	0.214	0.228	R	0.0	0.00	0.000	3.611	5.71	14.31	37.22	55.40	66.4	96.4				
1745:48	29.21	-81.81	33.02	53.65	47	1.046	1.115	RT M	0.0	0.00	0.000	0.000	0.00	7.14	64.97	179.13	436.2	924.8				
1748:00	29.08	-81.85	32.96	53.71	49	0.211	0.225	RT M	0.0	0.00	0.000	5.193	7.59	19.91	47.40	64.59	63.9	70.5				
1750:12	28.80	-81.32	32.98	53.50	47	0.235	0.251		0.0	0.00	0.000	1.836	4.88	12.11	35.78	55.52	67.2	92.9				
1752:24	29.66	-81.00	33.00	53.27	46	0.344	0.367	RT	0.0	0.00	0.000	0.000	3.96	11.13	48.98	75.61	77.7	72.0				
1754:36	29.42	-80.82	32.97	52.95	46	0.234	0.250	R	0.0	0.00	0.000	1.891	4.79	12.40	34.43	52.17	68.3	87.5				
1756:49	29.19	-80.86	31.00	52.67	45	2.500	2.666	RT M	0.0	0.00	0.000	0.000	1.31	7.96	20.78	180.31	326.1	577.6				
1759:01	29.27	-81.11	32.98	52.72	133	0.319	0.338	RT M	0.0	0.00	0.000	0.000	3.06	13.71	41.04	74.74	91.0	129.2				
1751:12	29.53	-81.23	32.99	52.94	212	0.229	0.248	M	0.0	1.76	0.000	3.036	5.71	15.03	35.56	62.49	72.2	102.6				
1753:24	29.82	-81.33	33.00	53.18	47	0.192	0.205	RT M	0.0	0.00	0.000	3.215	6.30	16.41	36.12	44.11	87.3	148.2				
1755:36	30.08	-81.26	32.97	53.41	47	0.220	0.235	M	0.0	0.00	0.000	3.108	6.08	15.09	40.95	65.30	77.9	105.6				
1757:48	30.25	-81.04	33.00	53.54	48	0.154	0.164	RT M	0.0	5.69	0.311	7.770	6.80	15.14	37.05	48.52	40.1	44.4				
1759:00	30.03	-80.93	32.97	53.29	48	0.272	0.291	RT	0.0	0.00	0.000	0.000	3.80	11.18	33.54	57.12	67.9	96.5				
1751:12	29.78	-81.06	32.98	53.02	47	0.245	0.261		0.0	0.00	0.000	2.648	4.46	12.45	34.14	55.71	66.1	86.4				
1753:24	29.52	-81.20	32.99	52.76	48	0.166	0.178	R M	0.0	4.65	0.225	6.701	5.89	13.16	37.69	58.28	27.1	13.3				
1755:36	29.36	-81.92	32.97	52.59	50	0.271	0.283	R M	0.0	0.00	0.000	0.000	2.33	14.40	36.01	58.89	83.6	107.8				
1757:48	29.38	-81.70	33.02	52.57	49	0.774	0.831	PT M	0.0	0.00	0.000	0.000	2.40	7.29	18.83	42.22	182.2	506.9				
1759:59	29.57	-81.67	32.37	52.79	49	0.233	0.249	PT	0.0	0.00	0.000	3.835	6.56	18.16	43.52	61.21	67.2	82.7				
1751:12	29.70	-81.36	32.98	52.92	51	0.240	0.256		0.0	0.00	0.000	2.319	4.76	12.30	35.68	54.27	65.1	89.6				
1753:23	29.79	-81.01	33.00	53.04	47	0.431	0.460	RT M	0.0	0.00	0.000	0.000	4.21	23.69	84.29	100.48	70.9	66.4				
1755:35	29.71	-80.67	32.99	52.99	46	0.281	0.300	R M	0.0	0.00	0.000	0.000	3.47	10.56	29.60	47.18	113.2	140.9				
1757:47	29.54	-80.56	32.94	52.87	47	0.360	0.385	RT M	0.0	0.00	0.000	0.000	1.63	7.23	101.80	162.24	323.9	523.1				
1759:59	29.46	-80.84	32.98	52.78	50	0.324	0.345	RT M	0.0	0.00	0.000	0.000	5.75	17.60	56.43	102.59	145.6	225.8				
1751:11	29.56	-81.13	32.98	52.90	49	0.245	0.261		0.0	0.00	0.000	2.520	4.37	12.21	33.46	54.89	60.8	89.0				
1753:22	29.68	-81.41	33.00	53.04	50	0.239	0.254	RT M	0.0	12.85	0.760	14.446	10.71	25.91	15.53	25.11	25.8	176.2				
1755:34	29.91	-81.57	32.97	53.29	50	0.222	0.236		0.0	0.00	0.000	3.345	5.37	12.98	36.60	57.37	69.2	88.1				
1757:46	30.17	-81.61	33.02	53.59	47	0.357	0.381	RT M	0.0	0.00	0.000	0.000	16.83	53.31	170.65	302.89	581.2	1168.6				
1759:59	30.15	-81.34	32.36	53.05	49	0.175	0.187	RT M	0.0	0.00	0.206	7.446	7.04	16.73	36.80	47.86	57.7	68.2				
1751:10	29.53	-81.20	32.98	53.46	49	0.250	0.267		0.0	0.00	0.000	2.374	4.31	12.65	34.51	52.66	61.6	79.7				
1753:22	29.61	-81.09	32.99	53.26	49	0.244	0.260	R	0.0	0.00	0.000	2.434	4.44	11.98	34.27	53.56	62.1	91.6				
1755:33	29.34	-81.09	32.97	53.06	52	0.220	0.235	R	0.0	0.00	0.083	3.303	5.14	13.12	34.28	54.90	59.4	86.7				
1757:45	29.11	-81.26	33.02	52.89	51	0.181	0.193	PT M	0.0	33.65	1.688	3.810	5.48	13.11	32.66	55.12	61.1	95.1				
1759:57	29.27	-81.44	32.96	53.06	52	0.534	0.570	RT M	0.0	2.21	0.130	3.664	5.34	5.96	16.80	47.75	72.9	123.9				
1751:00	29.51	-81.37	32.98	53.43	51	0.233	0.247	R M	0.0	0.00	0.000	2.583	5.59	14.85	40.07	64.65	79.4	100.4				
1753:21	29.78	-81.22	32.94	53.81	49	0.239	0.255	R M	0.0	0.00	0.000	3.491	5.28	14.87	40.20	66.92	72.7	105.9				
1755:32	29.98	-80.98	32.98	54.14	49	0.214	0.228	PT	0.0	6.21	0.000	3.028	4.57	11.64	30.16	48.48	55.8	81.3				
1757:44	30.07	-80.63	32.98	54.34	50	0.233	0.249	R	0.0	0.00	0.000	2.775	4.46	11.77	33.97	50.68	63.2	78.4				

DATE= 751215 (YR-MO-DAY)										NASA - GASP - FALL 1975 FLIGHTS									
THAR	LAT	LONG	PRESS	SUN	03	MEAS	TOTAL	Q0000	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9	
H14 S3	(N)	(E)	(FT)	(D)	PPB	070NE	CZONE	(PFASURE)	DOWNWARD	SOLAR	FLUX	IN	(E-06)	W/(CM**2-NM)	WAVELENGTH	IN	NM)		
(ZPT)	(N)	(E)	(FT)	(D)		(ATH-CK)		BB	RE	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
1104:56	30.18	-40.29	33.82	54.68	47	0.235	0.252		0.0	1.40	0.000	2.043	4.01	11.00	30.90	50.64	59.4	77.8	
1107:5	30.29	-79.95	35.60	54.97	44	0.215	0.231		0.0	0.00	0.071	2.676	4.75	12.45	32.17	51.55	57.6	82.8	
1110:20	30.38	-79.61	37.62	55.26	42	0.245	0.264		0.0	0.00	0.000	2.026	3.97	11.86	32.31	51.94	62.5	84.4	
1111:31	30.47	-79.24	36.84	55.56	40	0.233	0.252		0.0	1.59	0.000	2.451	4.66	11.89	35.68	55.79	62.6	93.1	
1113:43	30.56	-79.05	35.00	55.87	38	0.240	0.258		0.0	0.00	0.096	2.808	4.33	11.96	35.50	55.18	61.7	90.9	
1115:55	30.65	-78.61	34.99	56.14	36	0.214	0.231		0.0	1.50	0.000	2.919	4.91	12.21	34.50	54.56	63.4	89.5	
1117:1	30.74	-78.27	34.99	56.52	37	0.248	0.269		0.0	0.00	0.073	2.315	3.30	9.73	28.44	45.56	57.9	86.0	
1120:13	30.78	-77.95	34.02	56.81	40	0.170	0.183	RT M	0.0	3.57	0.159	5.783	5.27	12.88	33.36	43.33	40.2	34.2	
1122:30	30.77	-77.96	34.77	56.77	38	0.755	6.814	RT N	0.0	0.00	0.000	0.000	2.65	9.37	36.03	87.57	196.4	447.1	
1124:42	30.47	-78.23	38.19	56.77	36	0.235	0.254	M	0.0	0.00	0.063	1.718	2.99	9.08	24.36	38.91	46.3	60.2	
1126:54	30.39	-78.52	38.99	56.77	38	0.222	0.239	M	0.0	0.00	0.000	2.038	3.24	8.95	24.42	41.00	46.3	63.1	
1128:16	30.30	-78.81	38.98	56.78	39	0.243	0.262	M	0.0	0.00	0.000	1.492	3.13	8.91	26.89	41.51	52.3	68.5	
1131:17	30.22	-79.10	38.99	56.78	40	0.231	0.249	M	0.0	0.00	0.000	1.267	3.39	9.15	27.02	43.88	54.2	65.0	
1133:22	30.13	-79.39	38.39	56.79	41	0.240	0.260	N	0.0	0.00	0.000	1.657	3.37	8.67	27.77	43.32	52.5	67.6	
1135:41	30.05	-79.67	38.19	56.80	43	0.249	0.269	M	0.0	0.00	0.000	1.531	3.01	9.67	26.85	43.26	49.6	74.4	
1137:53	29.97	-79.96	38.79	56.81	43	0.249	0.269	N	0.0	0.00	0.000	1.518	2.61	8.36	23.66	40.32	46.9	57.9	
1140:14	29.89	-80.23	38.93	56.83	41	0.236	0.255	N	0.0	0.00	0.000	1.625	2.80	8.19	22.47	39.39	46.7	60.0	
1142:16	29.80	-80.51	38.39	56.85	41	0.229	0.248	M	0.0	1.14	0.060	2.370	3.07	8.09	25.05	39.56	39.8	59.7	
1144:24	29.72	-80.79	38.99	56.86	42	0.245	0.264	M	0.0	0.00	0.056	2.294	3.00	8.89	26.74	43.13	46.4	65.7	
1146:31	29.63	-81.06	38.99	56.88	41	0.231	0.249	M	0.0	0.00	0.000	1.551	3.46	10.16	27.18	44.08	56.7	71.2	
1148:51	29.54	-81.34	37.39	56.90	42	0.332	0.358	RT M	0.0	0.00	0.000	0.000	2.85	8.47	31.43	65.91	76.9	96.5	
1151:1	29.35	-81.45	38.47	56.93	45	0.322	0.348	RT N	0.0	0.00	0.000	0.000	14.23	35.65	61.20	126.39	298.5	508.3	
1153:14	29.22	-81.34	37.79	56.92	39	0.230	0.249	N	0.0	0.00	0.000	1.822	3.74	10.71	28.39	48.51	50.2	78.4	
1155:16	29.14	-81.22	38.19	56.71	38	0.224	0.241	R N	0.0	1.21	0.080	4.624	4.78	14.33	29.53	40.63	44.5	16.8	
1157:14	29.04	-81.05	39.00	57.03	39	0.763	0.823	RT N	0.0	0.00	0.000	0.000	1.35	6.53	20.78	48.73	291.3	495.9	
1159:41	28.84	-80.87	38.98	57.50	38	0.190	0.205	RT M	0.0	0.00	1.163	17.899	24.63	62.16	151.78	214.43	333.1	565.7	
1162:1	28.76	-80.96	38.98	57.72	39	0.247	0.267	M	0.0	0.00	0.069	1.786	2.90	8.98	27.27	45.45	51.4	70.1	
1164:12	28.37	-81.08	38.99	58.33	42	0.232	0.250	N	0.0	0.00	0.000	1.910	2.98	8.62	25.64	39.36	48.0	68.1	
1166:24	28.13	-81.20	39.99	58.74	43	0.241	0.260	M	0.0	1.24	0.000	2.017	2.85	8.79	27.08	45.70	45.8	65.7	
1168:31	28.00	-81.12	39.79	59.15	41	0.197	0.212	R N	0.0	5.65	0.287	6.562	4.47	12.69	36.02	23.41	25.6	37.3	
1171:47	30.17	-81.39	38.73	59.77	43	0.231	0.250	M	0.0	0.00	0.055	2.063	2.58	7.82	23.73	39.12	42.4	62.8	
1172:51	30.45	-81.43	39.38	60.06	43	0.239	0.258	N	0.0	1.69	0.000	2.035	2.62	7.99	26.07	38.50	43.4	63.3	
1175:11	30.73	-81.47	39.73	60.52	41	0.248	0.267	N	0.0	0.00	0.000	1.740	2.26	8.59	25.44	40.61	48.1	66.2	
1177:22	31.01	-81.50	38.93	60.99	40	0.246	0.267	R N	0.0	0.00	0.000	0.000	2.62	8.46	19.01	43.61	63.4	100.3	
1179:34	31.24	-81.53	39.02	61.45	39	0.227	0.257	RT N	0.0	0.00	0.000	0.000	3.97	14.15	41.34	225.7	639.3		
1181:45	31.35	-81.21	38.17	61.85	40	0.295	0.318	RT M	0.0	5.20	0.185	0.000	1.09	8.41	29.92	43.92	42.7	47.5	
1183:17	31.09	-81.17	38.79	61.54	40	0.270	0.291	P N	0.0	0.00	0.000	0.000	3.38	9.93	32.92	58.14	96.8	172.6	
1185:3	30.81	-81.13	38.97	61.98	40	0.313	0.338	N	0.0	0.00	0.000	0.000	3.49	10.93	40.15	76.23	127.4	210.7	
1187:20	30.53	-81.06	39.79	62.04	42	0.249	0.269	N	0.0	0.00	0.129	0.000	3.79	11.43	37.78	59.45	110.3	189.3	
1189:33	30.24	-81.00	39.99	62.10	44	0.272	0.293	N	0.0	0.00	0.000	0.000	3.97	12.72	46.61	71.66	124.3	198.9	
1191:43	29.36	-80.94	39.98	62.17	42	0.264	0.285	N	0.0	0.00	0.000	0.000	3.32	11.46	36.50	65.46	104.2	190.0	
1194:55	29.08	-80.86	39.99	62.24	43	0.257	0.278	N	0.0	0.00	0.142	0.000	3.81	10.97	37.65	59.80	113.2	190.0	
1197:1	28.82	-80.82	39.99	62.33	42	0.238	0.256	N	0.0	3.32	0.178	0.000	4.00	12.07	39.20	61.99	93.9	163.0	
1199:14	28.13	-80.78	38.99	62.41	38	0.253	0.273	R N	0.0	13.04	0.670	0.000	3.48	9.84	32.93	56.36	83.0	159.0	
1201:41	27.07	-80.52	38.95	63.04	39	0.174	0.188	RT N	0.0	0.96	0.134	3.919	2.37	6.44	19.84	24.43	25.0	31.5	
1203:53	26.30	-80.50	38.98	63.57	38	0.281	0.304	N	0.0	0.00	0.000	0.000	2.96	12.70	40.95	79.38	138.8	225.8	
1206:4	25.51	-80.50	39.99	64.10	43	0.210	0.109	N	0.0	0.00	0.000	0.000	2.71	9.27	37.16	63.32	113.2	167.3	
1208:16	24.63	-80.50	39.98	64.62	42	0.261	0.282	T N	0.0	0.00	0.000	0.000	2.24	8.91	29.81	54.47	95.4	165.8	
1210:24	23.16	-80.50	39.99	65.14	42	0.288	0.311	T N	0.0	0.00	0.000	0.000	2.20	7.75	29.42	56.24	88.0	164.4	

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

DATE= 751216 (YR-MO-DAY) DAY= 350 FIT NO= 11 NASA - GASP - FALL 1975 FLIGHTS										MEASUREMENTS									
TIME	LAT	LONG	PRESS	SCN	03	MEAS	TOTAL	00000	227.1	302.3	292.0	307.5	307.0	311.1	322.4	329.7	371.3	401.9	
(MM)	(DEG)	(DEG)	(ALT)	(DEG)	PPB	OZONE	CZONE	(ATM-CM)	RE	FE	NE	NE	NE	NE	NE	NE	NE	NE	
(MM)	(N)	(E)	(FT)	(DEG)															
1410:44	30.33	-82.55	13.71	54.99	23	0.215	0.221	A	0.0	0.00	0.000	1.417	3.96	10.08	28.14	48.53	58.8	81.7	
1413:56	30.36	-82.81	17.29	55.08	33	0.246	0.255	A	0.0	0.00	0.000	1.333	3.73	10.97	33.23	52.10	62.2	83.1	
1415:21	30.39	-83.07	20.53	55.18	28	0.236	0.246	N	0.0	0.00	0.000	1.651	4.21	12.83	32.95	52.23	60.1	89.7	
1417:01	30.43	-83.34	23.44	55.28	27	0.231	0.241		0.0	0.00	0.000	2.156	4.52	12.59	35.67	56.78	65.6	98.7	
1418:34	30.46	-83.63	25.89	55.37	28	0.206	0.216		0.0	0.00	0.000	2.955	5.43	14.07	36.10	59.31	68.7	93.2	
1421:47	30.50	-83.92	27.64	55.47	27	0.210	0.221		0.0	0.00	0.000	2.259	4.91	12.35	33.87	55.63	66.7	85.8	
1423:57	30.53	-84.22	29.32	55.56	36	0.197	0.208		0.0	2.12	0.094	3.441	5.49	13.40	35.46	54.55	56.3	89.7	
1425:12	30.59	-84.52	30.81	55.64	42	0.433	0.459	R N	0.0	6.34	0.290	1.987	9.75	25.55	53.52	28.16	18.0	52.0	
1426:24	30.68	-84.81	31.01	55.82	42	0.247	0.263	R M	0.0	3.62	0.000	4.817	5.03	16.80	33.44	46.99	46.9	94.1	
1428:37	30.75	-85.11	31.01	55.96	41	0.432	0.459	R	0.0	1.75	0.000	4.380	2.45	5.38	29.40	47.48	70.9	83.3	
1430:41	30.84	-85.39	31.01	56.11	43	0.214	0.228	R M	0.0	0.00	0.000	0.000	5.10	11.81	27.86	56.18	77.8	99.4	
1431:12	30.89	-85.68	31.01	56.23	37	0.197	0.209	R M	0.0	9.65	0.272	3.654	4.49	11.17	29.62	46.19	52.8	70.6	
1433:14	30.88	-85.97	31.01	56.28	38	0.233	0.248		0.0	0.00	0.000	1.787	4.25	11.50	34.40	53.39	67.8	87.5	
1435:26	30.86	-86.26	31.01	56.34	38	0.222	0.236		0.0	0.00	0.000	1.598	4.51	12.03	34.38	53.74	67.0	86.4	
1437:37	30.85	-86.55	31.01	56.39	40	0.191	0.203	R N	0.0	3.83	0.218	5.196	4.48	12.17	33.06	52.81	22.2	27.4	
1439:51	30.86	-86.84	31.01	56.47	39	0.222	0.235	M	0.0	0.00	0.000	1.685	3.70	10.01	28.28	49.07	54.4	71.7	
1442:04	30.90	-87.14	31.01	56.58	41	0.227	0.242	M	0.0	0.00	0.000	1.871	3.78	11.09	29.68	50.44	58.6	77.5	
1444:16	30.94	-87.43	31.01	56.69	45	0.223	0.237		0.0	0.00	0.000	1.935	4.11	11.83	30.67	51.49	63.4	78.6	
1446:28	30.98	-87.73	31.01	56.80	45	0.222	0.236		0.0	0.00	0.000	2.092	4.12	11.68	31.77	50.56	60.4	82.7	
1448:41	31.02	-88.03	31.02	56.91	142	0.224	0.240	N	0.0	0.00	0.000	2.228	4.17	11.64	33.15	52.94	59.1	84.0	
1450:53	31.06	-88.34	31.01	57.02	257	0.219	0.240	N	0.0	1.55	0.078	2.661	4.31	11.03	33.37	53.89	59.4	81.6	
1453:05	31.10	-88.64	31.01	57.13	257	0.238	0.260	N	0.0	1.67	0.000	1.465	3.65	10.21	30.19	54.59	65.5	80.8	
1455:17	31.18	-88.94	31.01	57.24	257	0.231	0.253	N	0.0	0.00	0.000	2.414	3.51	9.98	29.81	46.93	54.3	70.3	
1457:30	31.14	-89.23	31.02	57.35	257	0.219	0.239	N	0.0	0.00	0.000	1.981	3.69	10.58	28.34	45.67	53.0	68.3	
1459:42	31.21	-89.53	31.01	57.46	257	0.219	0.240	N	0.0	0.00	0.000	2.393	3.87	11.17	30.01	47.33	50.5	71.4	
1501:54	31.25	-89.81	31.01	57.58	257	0.212	0.232	N	0.0	0.00	0.000	1.785	3.70	9.90	26.64	47.82	56.2	68.3	
1504:06	31.28	-90.11	31.02	57.69	257	0.121	0.132	R N	0.0	5.96	0.318	6.752	5.38	14.18	40.18	62.25	24.1	23.3	
1506:18	31.36	-90.39	31.01	57.84	257	0.204	0.223	R	0.0	0.00	0.000	1.362	4.02	10.38	28.94	45.71	58.3	69.7	
1508:30	31.40	-90.66	31.02	58.04	43	0.220	0.234	M	0.0	1.01	0.000	2.435	3.20	9.19	26.12	42.05	45.3	64.6	
1510:43	31.59	-90.93	31.01	58.24	44	0.212	0.225	M	0.0	1.31	0.051	2.063	3.09	8.52	24.10	39.26	40.4	61.1	
1512:55	31.71	-91.20	31.01	58.43	49	0.215	0.229	M	0.0	1.27	0.062	1.552	3.13	8.74	25.34	39.39	42.3	56.9	
1515:07	31.82	-91.47	31.01	58.63	43	0.223	0.237	M	0.0	0.00	0.000	1.804	2.93	8.88	24.60	35.25	43.3	61.3	
1517:19	31.93	-91.75	31.02	58.82	48	0.219	0.232	M	0.0	0.00	0.058	1.996	3.01	8.60	25.48	39.48	42.1	60.2	
1519:31	32.05	-92.03	31.01	59.02	43	0.214	0.227	M	0.0	0.00	0.000	1.723	2.90	7.67	23.25	36.51	44.0	61.3	
1521:43	32.16	-92.30	31.01	59.22	46	0.214	0.227	M	0.0	0.00	0.000	1.696	2.78	8.25	21.93	36.22	46.7	57.4	
1523:55	32.27	-92.57	31.01	59.41	44	0.209	0.222	M	0.0	0.00	0.000	1.088	2.92	8.11	23.18	38.42	47.4	57.2	
1526:07	32.34	-92.85	31.02	59.61	47	0.224	0.238	M	0.0	0.00	0.000	1.069	2.13	6.63	19.04	27.72	36.3	48.5	
1528:19	32.49	-93.11	31.01	59.80	52	0.230	0.245	M	0.0	0.00	0.000	0.974	2.11	6.93	19.50	33.26	44.6	52.3	
1530:31	32.57	-93.38	31.01	60.00	47	0.236	0.251	N	0.0	0.00	0.000	1.320	2.04	6.27	19.74	32.21	40.2	53.8	
1532:43	32.70	-93.65	31.02	60.19	57	0.224	0.239	N	0.0	0.00	0.000	1.096	2.32	7.50	21.18	34.56	43.0	59.2	
1534:55	32.82	-93.91	31.01	60.40	46	0.241	0.256	P N	0.0	0.00	0.000	0.000	3.29	10.83	32.80	53.50	89.7	128.8	
1537:07	32.95	-94.16	31.01	60.63	44	0.225	0.239	N	0.0	0.00	0.000	1.261	2.79	8.97	25.25	45.59	60.1	76.0	
1539:19	33.09	-94.41	31.01	60.86	46	0.230	0.244	N	0.0	0.00	0.000	0.000	2.66	9.14	25.80	46.23	60.1	83.3	
1541:31	33.22	-94.66	31.01	61.09	55	0.247	0.263	N	0.0	0.00	0.000	0.000	2.61	8.78	27.83	47.67	69.6	98.6	
1543:43	33.36	-94.91	31.01	61.32	62	0.244	0.259	N	0.0	0.00	0.000	0.000	2.80	8.97	28.71	47.63	69.4	112.9	
1545:55	33.48	-95.16	31.02	61.55	63	0.254	0.270	N	0.0	0.00	0.000	0.000	2.62	8.07	26.04	48.56	68.7	102.9	
1548:07	33.63	-95.42	31.01	61.78	65	0.227	0.242	N	0.0	0.00	0.000	0.000	2.56	9.55	27.62	46.30	70.9	110.7	
1550:19	33.77	-95.68	31.01	62.01	70	0.227	0.242	N	0.0	0.00	0.000	0.000	2.43	8.86	26.48	42.51	67.6	115.1	
1552:31	33.90	-95.94	32.30	62.24	71	0.244	0.261	N	0.0	0.00	0.000	0.000	2.74	9.00	30.31	45.93	78.7	120.3	
1554:43	34.03	-96.18	31.01	62.47	54	0.137	0.161	R N	0.0	0.00	0.000	0.000	1.22	5.87	21.82	38.89	138.5	149.8	
1556:55	34.12	-96.43	31.00	62.67	50	0.238	0.255	R N	0.0	11.37	0.326	2.588	2.45	7.39	25.14	38.70	57.3	87.1	
1559:07	34.22	-96.69	31.02	62.86	63	0.227	0.251	N	0.0	0.00	0.000	0.000	1.42	6.95	22.36	47.03	83.9	138.0	
1601:19	34.39	-96.92	31.01	63.18	94	0.256	0.276	N	0.0	0.00	0.000	0.000	2.15	9.91	34.28	55.94	98.7	180.1	
1603:31	34.57	-97.15	34.99	63.42	92	0.239	0.257	N	0.0	0.00	0.000	0.000	2.37	9.02	28.73	48.16	83.3	140.7	
1605:43	34.74	-97.38	35.01	63.69	95	0.270	0.290	N	0.0	0.00	0.000	0.000	2.15	7.61	28.37	47.55	82.1	136.8	
1607:55	34.91	-97.60	35.01	63.97	93	0.260	0.280	N	0.0	0.00	0.000	0.000	2.21	7.21	25.93	44.24	72.7	125.4	

Some of the data from the 1975 flights were reduced earlier and presented in Ref. 1.4. Results from flight 3 over Wallops Island have been compared with balloon sonde and Dobson instrument measurements (Ref. 4.1). All these data are compared with the recomputed UVS results in Table 5.3. For altitudes less than 40 kft the present and earlier (Ref. 1.4) UVS ozone results are in excellent agreement. The averaged UVS total ozone is nearly identical to the integrated sonde ozone, and about 5% greater than the Dobson ozone. In view of the fact that all UVS measurements in Table 5.3 were with $\theta_{\text{sun}} > 59^\circ$, the agreement is excellent. The extreme non-standard operating conditions for the UVS in the Rayleigh scattered light only mode make the UVS derived ozone (for $\theta_{\text{sun}} > 59^\circ$) uncertain by more than $\pm 5\%$, probably as high as $\pm 10\%$, for altitudes less than 35 kft. Above 35 kft the UVS ozone values become even more inaccurate because much of the Rayleigh scattering takes place in the ozone layer, and the measured solar UV attenuation becomes a complicated function of the ozone thickness and vertical distribution (this was discussed briefly in Ref. 1.4). The last three values for UVS ozone in Table 5.3, being for $\theta_{\text{sun}} > 65^\circ$, are not listed in the data tabulations, which are cut off at $\theta_{\text{sun}} = 65^\circ$, but were taken from the full data listings.

The data tabulations do not include all the times presented in Ref. 1.4, because the magnetic tape data did not include all the time covered by the strip chart recordings used for the data presented in Ref. 1.4.

Table 5.3
Comparison of Ozone Measurements for the
Wallops Island Flight of Dec. 2, 1975

Time GMT (hr-min)	Altitude (kft)	θ_{sun} (deg)	Measured* ozone	Total* ozone	Integrated sonde ozone (Refs. 1.4 & 4.1)	Measured ozone (Ref. 1.4)	Ratio $\left(\frac{\text{Meas. here}}{\text{Meas. Ref. 1.4}} \right)$
1657	14.7	59.4	0.322	0.333		-	-
1734	20.0	60.9	0.333	0.347		-	-
1745	20.0	60.4	0.341	0.355		-	-
1807	25.0	63.0	0.346	0.364		-	-
1822	31.1	64.0	0.309	0.329	0.312	0.312	0.990
1836	31.1	63.7	0.307	0.328	0.312	0.310	0.990
1853	35.0	66.3	0.307	0.332	0.307	0.319	0.962
1917	40.0	69.3	0.279	0.304	0.301	0.250	1.116
1926	40.0	69.3	0.267	0.291	0.301	0.233	1.146
t_{O_3} averages for Alt. ≤ 35 kft			0.324	0.341		0.314	

From Ref. 4.1: Dobson $t_{\text{O}_3} = 0.324$, Integrated sonde $t_{\text{O}_3} = 0.340$

*Listed values are averages of three consecutive measurements. All measurements are approximately at 38°N lat., 75°W long., $\pm 1^\circ$.

Note: all ozone values are in atm-cm.

5.4 Comparison of UVS Derived Columnar Ozone with Dobson Station Measurements - Fall 1976

The Latitude Survey flights of 1976 overflow several Dobson Stations, allowing the comparison of UVS derived total ozone thicknesses with those obtained from the Dobson instruments. A total of nine stations, not all of them listed in Ozone Data of the World (Ref. 5.4), were overflowed, and are listed in Table 5.4 (note that American Samoa was not strictly overflowed, as there was still a 1° latitude difference).

As of June 1977 Dobson data for five overflights have been received (D. Briehl, personal communication), and these are compared with the UVS derived total ozone, as discussed in Section 5.1, in Tables 5.5 to 5.10. The comparison results are summarized in Table 5.11.

The Mauna Loa comparison on flight 5 is given in Table 5.5. Since flight 5 was a dawn flight, there is not much UVS data for solar zenith angles less than 60° . Thus the Mauna Loa comparisons are for near the end of the flight, and are at comparatively low altitudes. The comparison is, however, quite good, with the Dobson and UVS data averages being for nearly the same time. The Dobson data show about 7% changes in an hour, so the less than 2% disagreement of the Dobson and UVS total ozone is better than the variability in the Dobson-measured total ozone.

The Hobart comparison on flight 9, given in Table 5.6, also shows excellent agreement between Dobson and UVS total ozone values. For this comparison the high altitudes and small solar zenith angles are conditions for the most reliable UVS results. There is some diurnal variation evident in the Dobson ozone data, but near the time of the comparison the variations are small, only about 2% in an hour. The UVS and Dobson total ozone values agree to about 2%. Note that the UVS total ozone includes a 7% addition to the measured ozone value, whereas for the lower altitude Mauna Loa data the addition is less than 3%.

The Aspendale comparison on flight 9, given in Table 5.7, has comparisons with UVS data from three different altitudes. The higher altitude derived UVS total ozone values are about 4% low, while the low altitude (10.2 kft) value is 1.6% high. The average for all UVS total ozone values is 2.5% low, when compared to the Dobson data. This type of disagreement, while not large, could be due to a vertical ozone profile different from that corresponding to the averaged distribution used in the procedure to convert the measured UVS ozone to total ozone. Since the Dobson data show only small variations (less than $\pm 3\%$ from the average), the 1 hour difference between the times of the comparison measurements should not be a significant factor. The comparison suggests that UVS and Dobson total ozone agree to $\pm 2\%$, with the conversion to total ozone possibly adding another 2% disagreement for high altitude UVS measurements.

UVS data from flight 11 are compared with Hobart Dobson data in Table 5.8. The Dobson data, taken from about local noon on through the afternoon, show $\pm 7\%$ variation about the average of the four measurements. The 0057 GMT Dobson measurement is about 7% higher than the UVS average for about 1 hour earlier. The UVS and Dobson average agree almost exactly. Extrapolation of the Dobson data back 1 hour from the 0057 and 0205 GMT measurements would give a large disagreement, but for a questionable Dobson ozone value. In view of the large variations in the Dobson data, it seems best to use the average for comparison with the UVS total ozone, but to consider the resulting ratio (0.997) as uncertain by at least a few percent.

The comparison with the Macquarie Island Dobson data for flight 11 is given in Table 5.9. The 0053 GMT Dobson measurement used for comparison is almost identical to the average. The variation is $\pm 3\%$ about the average, less than half that for Hobart on this flight. The UVS total ozone is 5% lower than the Dobson measurement made an hour earlier.

The tabulated UVS data for flight 11 (pp. 34-35) show that the UVS total ozone only varies by $\pm 2\%$ maximum during the overflight periods for each of the two Dobson stations. Thus there was no significant latitude structure in total ozone near the Dobson stations during the overflight period. However, the data from flight 11 show that at 45°S latitude the total ozone at 0023 GMT and 149°E longitude was 0.314 atm-cm, and at 0338 GMT and 171°E longitude it was 0.345 atm-cm (both are averages of 2 consecutive readings). Thus for a difference of 3 hours and 22° in longitude, the total ozone increased by 10%. (The ozone density data show a significant concentration of ozone at 0338 GMT and 37 kft, indicating possible partial penetration of the aircraft into the stratosphere at this time.) The UVS data thus show that there was some structure in the longitudinal total ozone distribution, and are in agreement with the variability observed in the Dobson data if it is assumed that this structure was convected past the Dobson stations during the several hours covered by the various data in Tables 5.8 and 5.9. The comparisons for this flight may thus be subject to errors introduced by the total ozone variability over the Dobson stations, and the 1 hour difference between Dobson and UVS measurement times. The Dobson-UVS total ozone differences in Tables 5.8 and 5.9 are thus likely to be maximum deviations, with the actual agreement being significantly better.

The comparison of UVS total ozone with the Wellington Dobson data for flight 13 are given in Table 5.10. Here only one Dobson measurement for about 2-1/2 hours after the overflight is available. The agreement is to 2%, but the tabulation of UVS data for flight 13 (pp. 37-38) shows latitudinal variations, so the comparison may be influenced by the substantial time difference.

Table 5.4

List of Dobson Stations for Comparison with UVS
Ozone Column Measurements for the Fall 1976 Flights

<u>Station Name</u>	<u>Latitude (deg N)</u>	<u>Longitude (deg E)</u>	<u>Flight numbers for comparisons*</u>
Mauna Loa	19.53	-155.58	5/6,7/-
American Samoa	-14.25	-170.57	-/-/14
Mildura	-34.00	141.92	-/10/-
Aspendale	-38.03	145.10	9/-/-
Cape Grim	-40.68	144.68	-/9,11/-
Wellington	-41.33	174.82	13/-/-
Hobart	-42.83	147.50	9,11/-/-
Invercargill	-46.42	168.32	-/11,12/-
Macquarie Island	-54.48	158.97	11/-/12

*Flight number order is: Comparisons made/ Possible additional comparisons/ Flights at same latitude but different longitude. Possible additional comparisons indicates that UVS ozone data exist, but Dobson station data have not been obtained. The possible comparisons for Mauna Loa are actually about 30 longitude to the west.

Table 5.5

Comparison of UVS Columnar Ozone with Dobson Data
from Mauna Loa - Flight 5, Nov. 1, 1976

Dobson Ozone Data (Use average of underlined values for comparison):

Time (GMT-hrs-min): 1753, 1757, 1946, 1951, 2033, 2036

Total ozone (atm-cm): 0.265, 0.265, 0.246, 0.246, 0.265, 0.266

Averages for comparison: 1852 GMT, 0.256 atm-cm

UVS Ozone Data (Use average values for comparison):

<u>Time (GMT)</u> <u>(hrs-min)</u>	<u>Lat, Long</u> <u>(deg N, deg E)</u>	<u>Alt.</u> <u>(kft)</u>	<u>θ_{sun}</u> <u>(deg)</u>	<u>Meas.</u> <u>ozone</u>	<u>Total</u> <u>ozone</u>
1845	19.61, -155.53	14.9	59.9	0.244	0.252
1903	19.58, -155.61	11.0	56.4	0.246	0.252

Averages for comparison: 1854 GMT, 0.245, 0.252 atm-cm

So:
$$\frac{\text{Measured UVS}}{\text{Dobson}} = 0.957$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.984$$

Table 5.6

Comparison of UVS Columnar Ozone with Dobson Data
from Hobart - Flight 9, Nov. 10-11, 1976

Dobson Ozone Data (Use average of underlined values for comparison):

Time (GMT-hrs-min): 2058, 2206, 2304, 0006, 0057, 0202, 0410, 0508, 0609, 0716

Total ozone (atm-cm): 0.336, 0.332, 0.326, 0.317, 0.311, 0.317, 0.325, 0.326,
0.330, 0.339

Averages for comparison: 2235 GMT, 0.329 atm-cm

UVS Ozone Data (Use average values for comparison):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
2229	-42.16, 146.43	29.6	50.8	0.298	0.316
2233	-42.60, 146.97	35.8	49.7	0.298	0.320
2242	-42.02, 147.26	39.0	47.8	0.303	0.331

Averages for comparison: 2235 GMT, 0.300, 0.322 atm-cm

$$\text{So: } \frac{\text{Measured UVS}}{\text{Dobson}} = 0.912$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.979$$

Table 5.7

Comparison of UVS Columnar Ozone with Dobson Data
from Aspendale - Flight 9, Nov. 10-11, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): 2058, 2112, 2129, 2126, 2226, 0545, 0622, 0635

Total ozone (atm-cm): 0.322, 0.324, 0.315, 0.314, 0.318, 0.323, 0.326, 0.330

Value for comparison: 2226 GMT, 0.318 atm-cm

UVS Ozone Data (Use average for total ozone only):

<u>Time (GMT)</u> <u>(hrs-min)</u>	<u>Lat, Long</u> <u>(deg N, deg E)</u>	<u>Alt.</u> <u>(kft)</u>	<u>θ_{sun}</u> <u>(deg)</u>	<u>Meas.</u> <u>ozone</u>	<u>Total</u> <u>ozone</u>
2317	-38.17, 145.26	39.0	41.7	0.282	0.307
2319	-37.98, 145.04	39.0	41.4	0.278	0.303
2333	-38.06, 145.13	25.0	38.9	0.291	0.306
2357	-38.00, 145.09	10.2	34.6	0.315	0.323

Averages for comparison: 2332 GMT, 0.310 (total) atm-cm

So:	<u>Alt(kft)</u>	<u>Measured UVS/Dobson</u>	<u>Total UVS/Dobson</u>
	39.0	0.881	0.959
	25.0	0.915	0.962
	10.2	0.991	1.016

$$\left(\frac{\text{Total UVS}}{\text{Dobson}} \right) = 0.975$$

Table 5.8

Comparison of UVS Columnar Ozone with Dobson Data
from Hobart - Flight 11, Nov. 12-13, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): 0057, 0205, 0301, 0510

Total ozone (atm-cm): 0.328, 0.294, 0.286, 0.319

Value for comparison: 0057 GMT, 0.328 atm-cm
(Averages: 0246 GMT, 0.307 atm-cm)

UVS Ozone Data (Use average values for comparison):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
0002	-42.64, 147.33	35.0	34.4	0.282	0.302
0004	-42.89, 147.55	35.0	34.1	0.290	0.311
0006	-43.14, 147.74	35.0	33.9	0.285	0.306

Averages for comparison: 0004 GMT, 0.286, 0.306 atm-cm

$$\text{So: } \frac{\text{Measured UVS}}{\text{Dobson}} = 0.872 \quad \left(\frac{\text{Meas. UVS}}{\text{Dobson Av}} \right) = 0.932$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.933 \quad \left(\frac{\text{Total UVS}}{\text{Dobson Av}} \right) = 0.997$$

Table 5.9

Comparison of UVS Columnar Ozone with Dobson Data
from Macquarie Island - Flight 11, Nov. 12-13, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): 1942, 2140, 0004, 0053

Total ozone (atm-cm): 0.365, 0.358, 0.347, 0.358

Value for comparison: 0053 GMT, 0.358 atm-cm.

UVS Ozone Data (Use average values for comparison):

<u>Time (GMT (hrs-min))</u>	<u>Lat, Long (deg N, deg E)</u>	<u>Alt. (kft)</u>	<u>θ_{sun} (deg)</u>	<u>Meas. ozone</u>	<u>Total ozone</u>
0147	-54.31, 158.74	35.0	37.1	0.317	0.340
0151	-54.49, 159.54	35.0	37.6	0.318	0.342
0154	-54.38, 160.00	35.0	37.7	0.318	0.342

Averages for comparison: 0151 GMT, 0.318, 0.341 atm-cm

So: $\frac{\text{Measured UVS}}{\text{Dobson}} = 0.888$

$\frac{\text{Total UVS}}{\text{Dobson}} = 0.953$

Table 5.10

Comparison of Columnar UVS Ozone with Dobson Data
from Wellington - Flight 13, Nov. 16, 1976

Dobson Ozone Data:

Time (GMT-hrs-min): 0339

Total ozone (atm-cm): 0.362

UVS Ozone Data (Use average values for comparison):

<u>TIME(GMT)</u> <u>(hrs-min)</u>	<u>Lat, Long</u> <u>(deg N, deg E)</u>	<u>Alt.</u> <u>(kft)</u>	<u>θ_{sun}</u> <u>(deg)</u>	<u>Meas.</u> <u>ozone</u>	<u>Total</u> <u>ozone</u>
0114	-41.59, 174.47	31.8	26.9	0.345	0.370
0116	-41.39, 174.74	32.9	27.2	0.340	0.369
0118	-41.17, 175.02	33.0	27.4	0.339	0.367

Averages for comparison: 0116 GMT, 0.341, 0.369 atm-cm

So: $\frac{\text{Measured UVS}}{\text{Dobson}} = 0.942$

$\frac{\text{Total UVS}}{\text{Dobson}} = 1.019$

A summary of UVS-Dobson total ozone ratios is given in Table 5.11. The average of what are considered to be the six best values is 0.985, showing that the UVS and Dobson total ozone values agree to 1.5%. This is about the same result derived from the two $\Delta T=0$ hr measurements, with the first 2 entries in Table 5.11 giving an average ratio of 0.982. The UVS total ozone values thus agree with the Dobson data presented here to about 2%. As discussed earlier, the data for flight 9 over Aspendale indicate a possible $\pm 2\%$ additional variation in the conversion of measured ozone to total ozone, caused by extreme deviations in the vertical ozone profiles from the average used in the conversion procedure. Overall, the UVS total ozone values are generally in the range of 0% to 5% below the Dobson values.

Calculations summarized in Ref. 5.5 show that Dobson measurements can vary by up to a few percent from the true total ozone because of variations in the vertical temperature profile and the dependence of the ozone absorption cross section on temperature (Ref. 3.4). As already discussed, the conversion of UVS measured ozone to total ozone can also have errors of $\pm 2\%$ or so for non-standard vertical ozone profiles, which are not uncommon as illustrated by the data in Ref. 5.6. Thus the agreement of the UVS and Dobson total ozone values are excellent, and within the accuracy possible without more detailed conversions.

All of the ozone values from the UVS are derived from the narrow band (NB) (2 nm) filter measurements, and are thus directly comparable to the Dobson measurements, which are about 1 nm bandwidths. For the 1976 flights an additional set of two broad band (BB) filters (≈ 12 nm) was used. Comparison of the BB calculated ozone thicknesses to the NB results show systematic deviations of 30% high for small θ_{sun} to nearly equal at $\theta_{\text{sun}} = 70^\circ$. The results are summarized in Table 5.12, which compares measurements made in the 30-40 kft altitude range. The analysis procedure is identical to that for the NB filters, using calculated responses to derive the leakage flux and effective ozone absorption cross section, as described in Section 5.11.

The BB filter ozone data give an inherently less accurate ozone measurement, since a given change in ozone thickness produces a significantly smaller attenuation change than the corresponding optimum NB filter. The normal UVS operating mode uses the one or two best (in the sense of showing "optimum" attenuation for that particular time) of six NB filters for a given ozone measurement, and thus achieves better accuracy over a wide range of ozone thicknesses. This is particularly necessary for large θ_{sun} angles, where the attenuation path of solar UV through the ozone layer may be as large as 0.6 to 1 atm-cm.

Our findings are similar to the results reported in Ref. 5.7, where Dobson and Filter Ozonometer measurements were directly compared. Most of the total ozone measurements from the USSR and Eastern Europe

are made with Filter Ozonometers, with BB filters with full-width-at-half-maximum transmission bands of about 25 nm (Ref. 5.7). The data in Ref. 5.7 show that these BB Filter Ozonometers give values of total ozone about 10% low for small θ_{sun} and up to 30% high for large θ_{sun} , when compared directly with Dobson spectrophotometer results. The UVS results, using a modified method of data analysis with leakage flux subtraction, show a similar magnitude deviation, although with an opposite dependence on θ_{sun} . It should be possible to devise a corrected analysis procedure, possibly involving more than a three parameter fit to the calculated response as shown in Section 5.1.1, which will give more accurate ozone thicknesses from the BB filter measurements. However, the BB filter derived ozone values are unlikely to equal the accuracy obtainable with an optimally attenuated NB filter. The UVS data analysis procedure weights the different NB calculated ozone values to emphasize the optimally attenuated measurements, and so should always give an ozone thickness more accurate than that obtainable from BB filter measurements. The UVS accuracy should be similar to that of the Dobson instruments, since the wavelength band widths are comparable (1-2 nm). This indeed was found from the direct comparisons presented earlier.

Since there are some deviations between Dobson and Filter ground based Ozonometers, the UVS could be used to provide direct comparison of such ground ozone stations by a suitable overflight program. Should it become possible in the future to make flights with the UVS and other instruments over some of the Filter Ozonometer stations in the USSR and Eastern Europe, this would provide data of considerable use in eliminating possible systematic differences between different ground based ozone stations.

The UVS columnar ozone measurements for additional possible comparisons with Dobson data are summarized in Table 5.13. These are from overflights of Dobson stations for which no Dobson data have been received. The UVS measurements are generally averages of two or more entries from the Tables in Section 5.2. Note that American Samoa was not actually overflown, the UVS data being for a location 10° North of the coordinates in Table 5.4. Only unflagged data have been used to obtain the averages in Table 5.13. Not all the stations are listed in "Ozone Data for the World" (Ref. 5.4), but are from a list supplied by NASA.

Table 5.11

Summary of Comparison of UVS Columnar Ozone with
Dobson Data for Fall 1976 Flights

Flight	Date (1976)	Dobson Station	Av. Alt. (kft)	$\left(\frac{\text{Meas. UVS}}{\text{Dobson}}\right)$	$\left(\frac{\text{Total UVS}}{\text{Dobson}}\right)$	Comments a)
5	Nov. 1	Mauna Loa	13.0	0.957	0.984	$\Delta T=0$ hr
9	Nov. 10-11	Hobart	34.8	0.912	0.979	$\Delta T=0$ hr
		Aspendale	39.0	0.881	(0.959)	$\Delta T=1$ hr
		"	25.0	0.915	(0.962)	"
		"	10.2	0.991	(1.016)	"
		"	(28.3)	-	0.975	"
11	Nov. 12-13	Hobart	35.0	0.872	(0.933)	$\Delta T=1$ hr ^{b)}
		"	35.0	0.932	0.997	c)
		Macquarie	35.0	0.888	0.953	$\Delta T=1$ hr ^{d)}
13	Nov. 16	Wellington	32.6	0.942	<u>1.019</u>	$\Delta T=2\frac{1}{2}$ hr

Average of 6 values not in parentheses = 0.985

- a) ΔT is the approximate time lapse between the UVS and Dobson measurements being compared.
- b) The Hobart Dobson data show significant variations (see Table 5.8), so the $\Delta T=1$ hr may be a factor in the disagreement.
- c) These values are for the average of the four Hobart Dobson measurements (see Table 5.8).
- d) The Macquarie Island Dobson data show significant variations (see Table 5.9), so the $\Delta T=1$ hr may be a factor in the disagreement.

Table 5.12

Comparison of Broad Band and Narrow Band
UVS Measured Ozone Column Values

<u>Solar zenith angle (deg)</u>	<u>(Measured BB ozone) (Measured NB ozone)</u>
10	1.32
15	1.31
20	1.30
25	1.29
30	1.31
35	1.25
40	1.23
45	1.16
50	1.14
55	1.12
60	1.09
65	1.04
70	1.00

Note: All data are for 30-40 kft altitudes,
and are from the 1976 Latitude Survey Flights.

Table 5.13

UVS Columnar Ozone Data for Possible Future Comparison
with Dobson Measurements

<u>Dobson Station</u>	<u>Flight No.</u>	<u>Date (1976)</u>	<u>GMT^{b)} (hrs-min)</u>	<u>Lat, Long (deg N, deg E)</u>	<u>Alt. (kft)</u>	<u>Meas. ozone^{a)}</u>	<u>Total ozone^{a)}</u>
Mauna Loa	6	Nov. 3	2022	19.4, -158.0	26.8	0.224	0.236
			2254	20.0, -158.0	22.8	0.232	0.243
	7	Nov. 7	2102	19.4, -158.2	28.1	0.226	0.239
American Samoa ^{c)}	14	Nov. 17	2232	-13.2, -170.3	20.7	0.227	0.236
Cape Grim	9	Nov. 10	2132	-40.4, 144.8	37.0	0.289	0.315
			2152	-40.6, 144.7	21.0	0.307	0.321
			2210	-40.7, 144.8	10.2	0.314	0.321
			2254	-40.6, 146.7	39.0	0.297	0.325
	11	Nov. 12	2345	-40.7, 145.8	35.0	0.279	0.299
Mildura	10	Nov. 11	2135	-34.8, 142.5	31.1	0.285	0.305
			2151	-34.5, 142.2	25.0	0.282	0.298
			2205	-34.4, 142.0	15.0	0.292	0.303
Macquarie Island	12	Nov. 14	0427	-54.4, 168.9	33.0	0.320	0.342
Invercargill	11	Nov. 12	0323	-46.4, 168.7	37.0	0.322	0.354
	12	Nov. 14	0325	-46.5, 168.6	33.0	0.320	0.341

a) Units are atm-cm.

b) Some listed values are averages over two or more measurements.

c) American Samoa is actually 1° further South in latitude.

5.5 Latitude Ozone Profiles for the Fall 1976 Flights

Several of the Latitude Survey flights in the Fall of 1976 have good UVS ozone measurements over a large latitude range. These data can be combined to give the north-south variation of total ozone for November 1976. The data are for longitudes near 170°E for the southern most latitudes, and for longitudes near 130°W for the northern most latitudes.

Total ozone data derived from the UVS measurements on five Latitude Survey flights are plotted in Fig. 5.3. These data show the ozone minimum near the equator, the rise between about 15°S and 45°S , and strong latitudinal structure at about 28°N and 37°S . More detailed plots of the UVS measured ozone above flight altitude are given in Figs. 5.4, 5.5 and 5.6. These figures show the two latitude structures and the flat profile near the equator. Note that Fig. 5.3 shows total ozone corrected to ground level, while Figs. 5.4, 5.5 and 5.6 show UVS measured ozone above the flight altitude.

The structure in total ozone at 37°S appears to be rather wide if the data from flight 13 is compared to a smooth joining of the data from flight 12 (further south) and the northern most part of the flight 13 data. Actually, the region from 35°S to 50°S also shows variability with time and longitude. This is illustrated by data from flight 11 which are plotted in Fig. 5.7. Here the measured UVS ozone for the southbound and northbound legs of the flight are plotted and show a significant change in ozone for about a 20° shift in longitude.

A more detailed "graph" of the UVS total ozone results is given in Table 5.14, where total ozone values for every two degrees of latitude are given for 29°S to 55°S . The values are located approximately at the correct longitudes, and the date in November 1976 is given in parentheses. A substantial increase in total ozone is seen to occur from about 145°E to 180°E longitude. The data from Nov. 12-13 show an east-west gradient in total ozone for the range 47°S to 50°S , with the increase being in excess of 0.5% per degree of longitude at the maximum gradient. The data near 50°S and 170°E show some time dependence, with about a 5% decrease in total ozone from Nov. 12-13 to Nov. 14.

The UVS total ozone data, while showing some latitudinal and time variations, nevertheless give a reasonable picture of the North-South variation of total ozone, as shown in Fig. 5.3. For clarity, not all the data tabulated in Section 5.2 are shown in Fig. 5.3. The additional data fill in some of the gaps in Fig. 5.3, and give some information on the time variability of total ozone. Overall, the total ozone profile shown in Fig. 5.3 gives an excellent picture of the latitudinal distribution of ozone, as well as showing the latitude regions where ozone variability is found to be greatest.

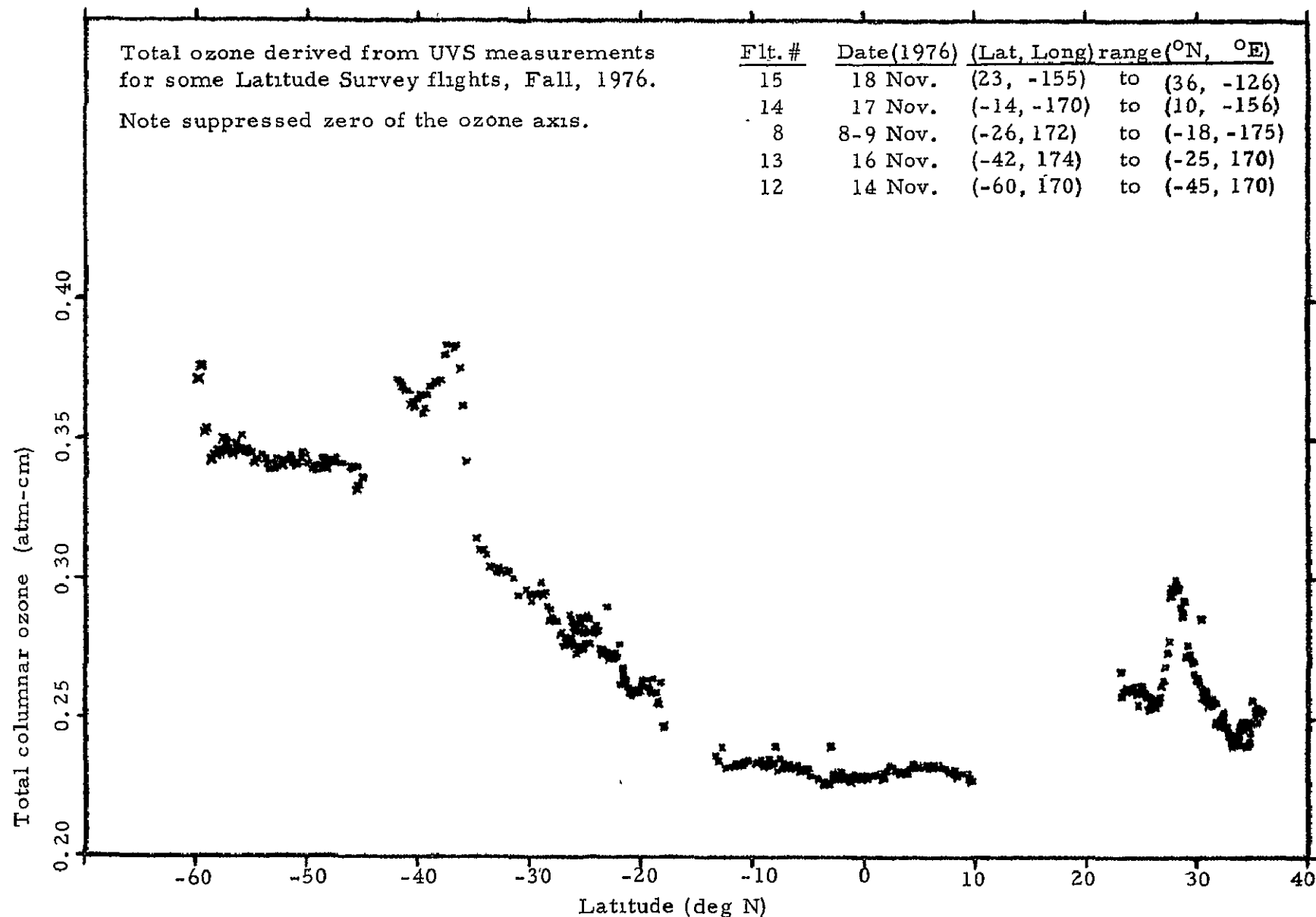


Fig 5.3. Latitude Profile of Total Ozone Derived from UVS Measurements for November 1976.

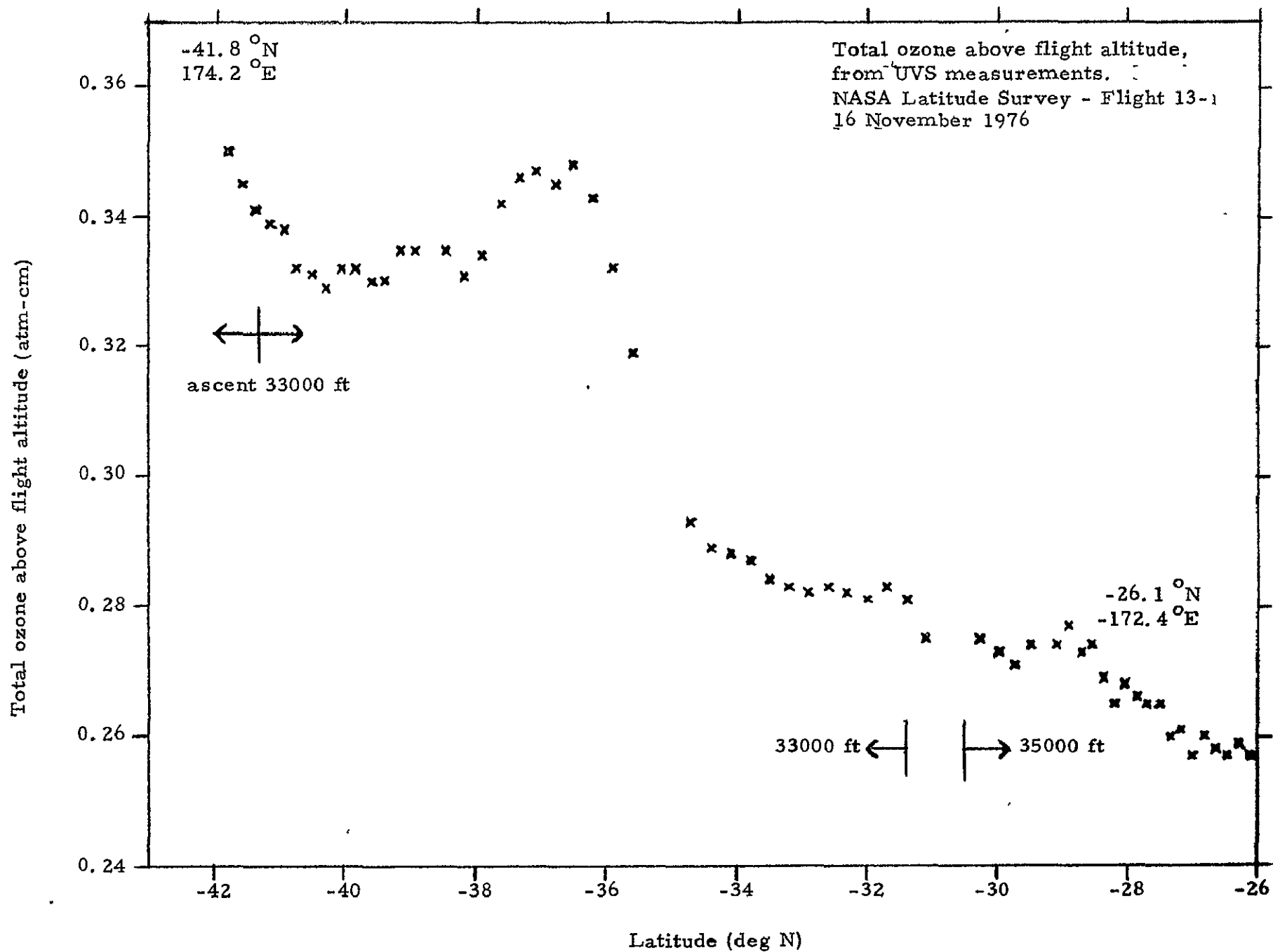


Fig. 5.4 UVS Measured Ozone above Flight Altitude for Flight 13, 16 Nov. 1976.

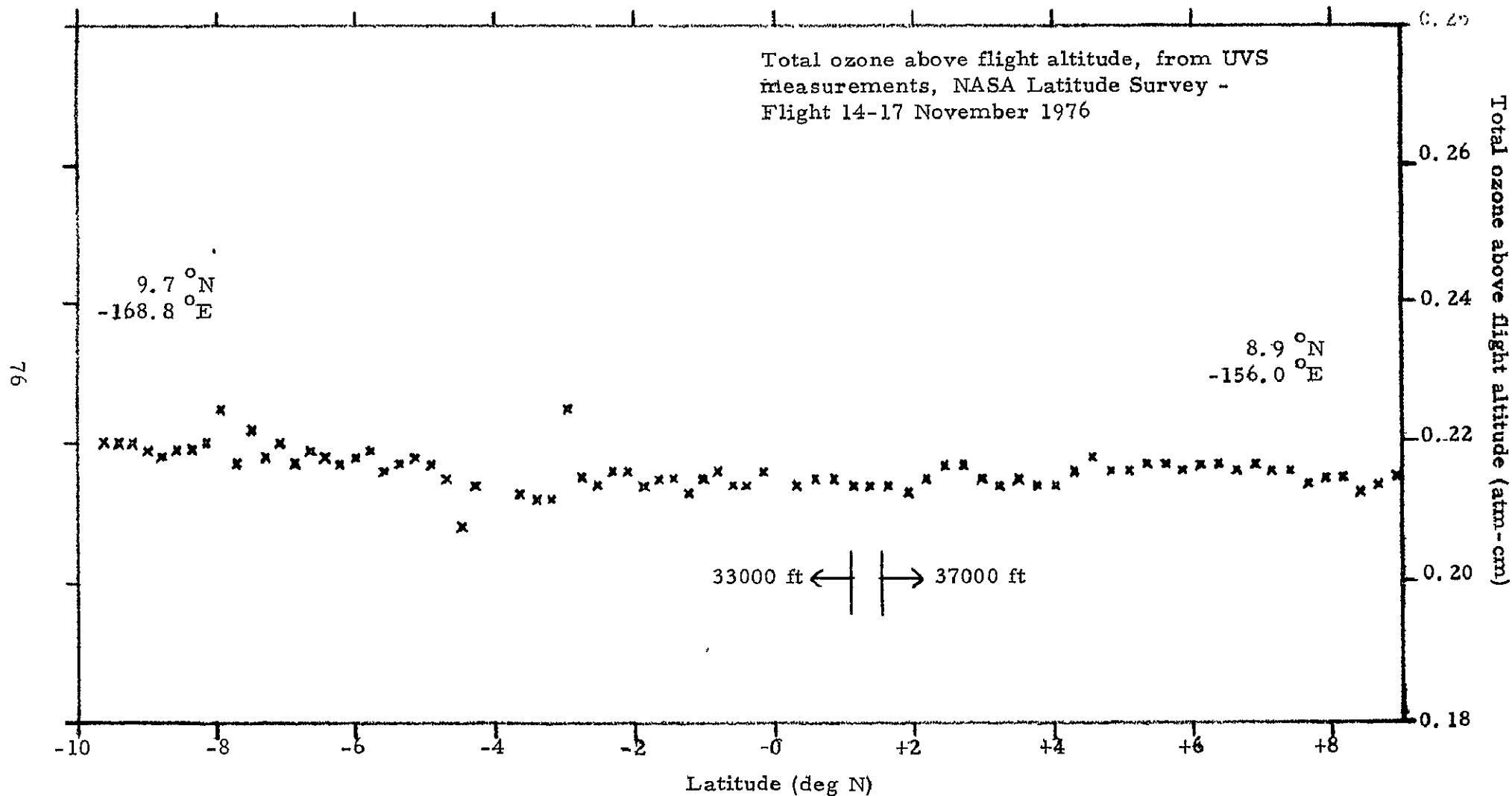


Fig. 5.5 UVS Measured Ozone above Flight Altitude for Flight 14, 17 Nov. 1976.

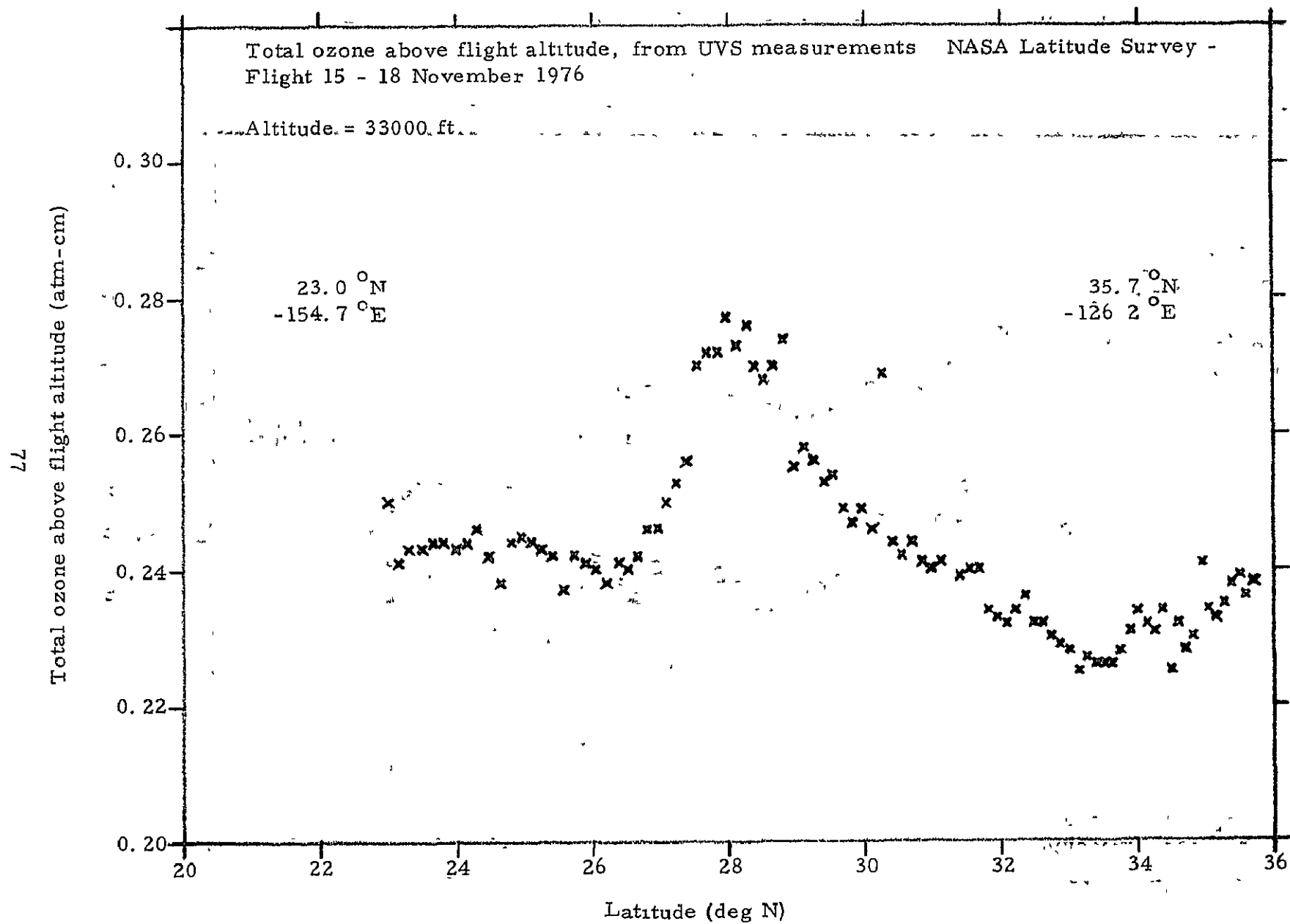


Fig. 5.6 UVS Measured Ozone above Flight Altitude for Flight 15, 18 Nov. 1976.

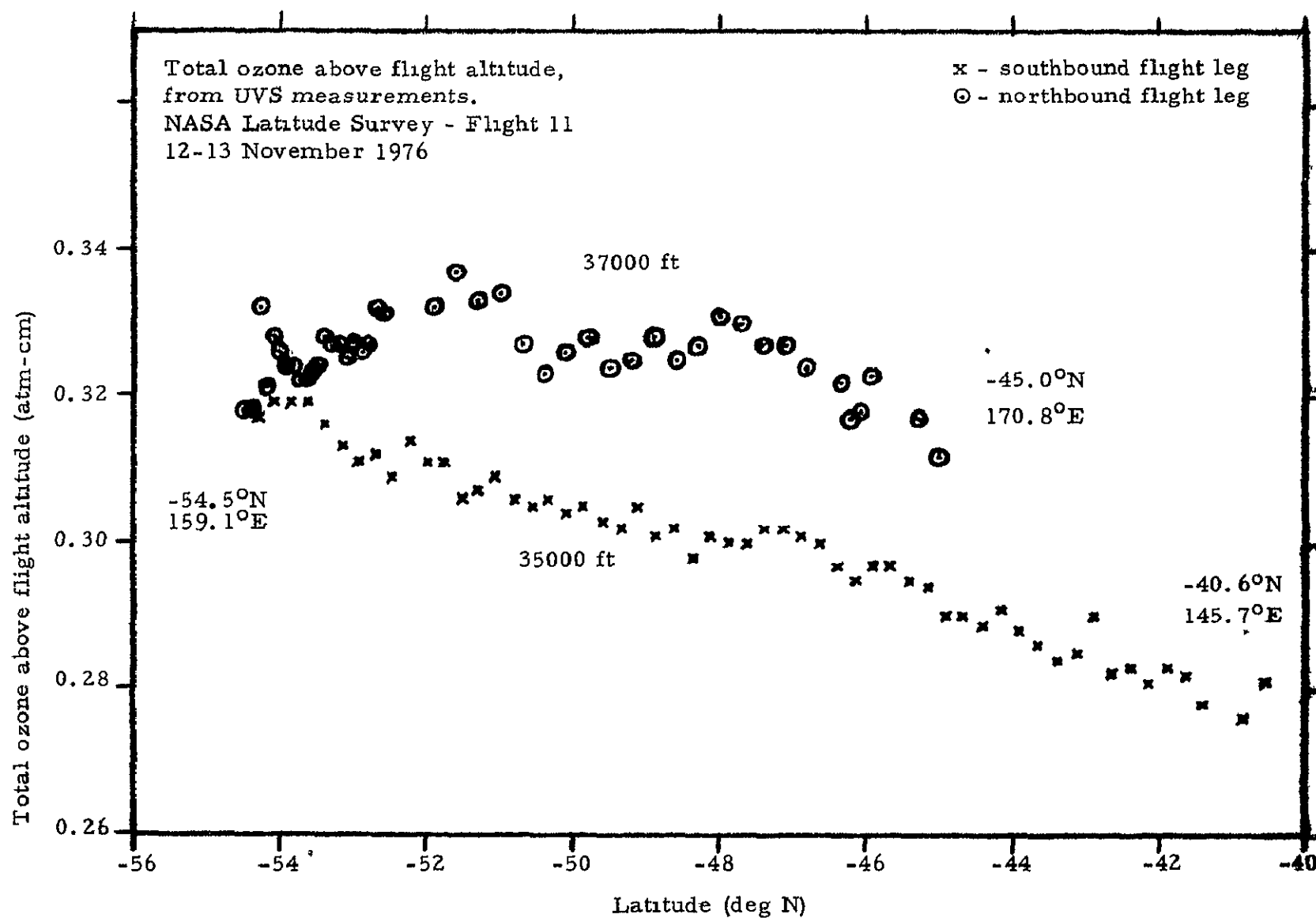


Fig. 5.7. UVS Measured Ozone above Flight Altitude for Two Legs of Flight 11,
12-13 November 1976.

Table 5.14
Time and Longitude Dependence of Total Ozone at
Latitude 30 to 55 Degrees South in November 1976
(Listed are total ozone (atm-cm) and (date(Nov. 1976))

Lat. (deg S)	Long (deg E)	140	150	160	170	± 180	-170
29					0.296(9)	0.297(16)	
31				0.295(9)		0.294(16)	
33			0.308(9)			0.304(16)	
35	0.308(11)					0.326(16)	
37	0.300(11)					0.383(16)	
39	0.308(11)					0.365(16)	
41	0.300(12-13) 0.325(11)				0.366(16)		
43	0.306(12-13)						
45	0.314(12-13)			0.335(14)			
47	0.323(12-13)			0.342(14)	0.345(12-13)		
49	0.326(12-13)			0.339(14)	0.358(12-13)		
51	0.329(12-13)			0.363(12-13) 0.341(14)			
53	0.335(12-13)			0.354(12-13) 0.340(14)			
55	0.342(12-13)			0.343(14)			

6. CONCLUSIONS AND RECOMMENDATIONS

The Panametrics' UV Spectrophotometer was successfully flown on fifteen Latitude Survey flights in the NASA CV-990 in the Fall of 1976. Several overflights of Dobson spectrophotometer stations allowed the UVS derived total ozone measurements to be compared with the Dobson results. The UVS data from the complete flight series give a good picture of the North-South (latitudinal) distribution of total ozone in November 1976.

The absolute accuracy of the UVS derived values for ozone above the flight altitude is estimated to be $\pm 3\%$, as discussed in Section 3. This accuracy is determined by laboratory calibration measurements, and responses calculated from measured ozone absorption coefficients and the solar spectrum in the 300 nm region. No adjustments have been made to the UVS data to force agreement with other measurements.

The comparison of UVS derived total ozone with the Dobson measurements presented here shows agreement to $\pm 2\%$. As discussed in detail in Section 5.4, this agreement is for those cases considered to be most valid for comparison, and it is also obtained from the two cases where the comparison should be the best. The UVS derived total ozone values average about 2% less than the Dobson results. Comparisons made with UVS data from different altitudes suggest that for very high altitudes with substantial penetration of the aircraft into the ozone layer, the procedure to correct UVS measured ozone to total ozone can result in an additional 2% decrease in UVS total ozone compared to Dobson total ozone. This effect might be reduced by improvements in the procedure used to correct for the columnar ozone below the aircraft.

The UVS operated properly and reliably on the CV-990 flights. Latitude profiles of UVS measured ozone near the equator show that for flat (longitudinal) ozone profiles the variation, or reproducibility, of the UVS ozone is better than $\pm 1\%$. These results indicate that the photodiode version of the UVS should operate reliably and easily on the commercial aircraft of the NASA Global Air Sampling Program (GASP).

The UVS data from the Fall 1976 Latitude Survey flights provide a detailed view of the north-south variation in total ozone, including the structure which exists near the mid-latitudes (30° to 40° N or S). The UVS data are for only one latitude-longitude path over the Pacific Ocean, but still provide important data on the ozone distribution in that region as it existed in November 1976.

The operation of, and results from, the UVS on the Fall 1976 flights demonstrate its accuracy and potential for further contribution to improving world ozone data. The UVS would be a useful addition to the NASA

package on board commercial aircraft used in the GASP. The data acquired from such instruments would provide information on the detailed latitudinal-longitudinal structure of total ozone, and aid in interpreting the large variability in total ozone measured by Dobson stations.

An important use for the UVS would be in a program to intercalibrate the various ground-based total ozone stations, in particular the Dobson and M-83 Filter ozonometers. Measurements have shown that the Dobson and M-83 Filter ozonometers can give differences of more than 20% in total ozone (Ref. 5.7). Since the Filter ozonometer is used primarily in the USSR and Eastern Europe, this can lead to systematic errors in world ozone profiles. Such a systematic error has been inferred in Ref. 6.1, where comparison of the total ozone and temperature profiles over Europe were found to be in disagreement, contrary to expectations. The author concluded that as of 1973 total ozone results were unreliable, and felt that further comparison of ozone instruments was needed. The need for intercomparison of ozone stations, both Dobson and Filter type, was strongly expressed in Ref. 6.2. The effect of instrumental differences on analyses of total ozone profiles and seasonal changes, and the necessity to reduce these effects by intercomparison of stations, was also noted in Ref. 6.3. The UVS would be an excellent instrument to provide these intercomparisons.

Satellite mounted instruments have been developed to measure total ozone and its vertical distribution from infrared (IRIS, Ref. 6.4, 6.5) and backscattered solar ultraviolet (BUV, Ref. 6.6) radiation. The IRIS total ozone results agree with mid-latitude Dobson data to about 6%, with poorer agreement in the tropics (Ref. 6.4, 6.5). The BUV and Dobson total ozone results differed by ± 0.02 atm-cm (standard error, Ref. 6.5). Satellite ozone data, while providing wide coverage, also have some limitations. Latitudinal coverage is generally 1-2 degrees per point, while longitudinal coverage is about every 20 degrees, and measurements are all at nearly the same local time, which changes slowly throughout the year. Newer satellites should provide more complete longitudinal coverage (Ref. 6.7), and reduce the aliasing problem in using satellite data for ozone variability studies (Ref. 6.8, p.5). However, the local time problem still remains, and seasonal maps of total ozone prepared from satellite data may have some component of daily variation in total ozone included. Additionally, the satellite instruments must operate for many years without the opportunity for laboratory calibration.

The UVS can help provide ground-truth for many satellite ozone measurements. The inclusion of a UVS in the commercial aircraft GASP package would provide much comparison data with satellite ozone measurements under a wide variety of solar zenith angle conditions. Time and position coincidence of UVS and satellite measurements are likely to be much more common than for Dobson station satellite coincidences. This is particularly

important because of the observed longitudinal variability in total ozone (Ref. 5.2, p 16, also indicated by some of the UVS data discussed in Section 5.5).

The latitudinal structure in total ozone measured by the UVS and discussed in Section 5.5 makes it desirable to fly the UVS on future CV-990 Latitude Survey type flights. This would allow measurement of the variability in the structure observed in the latitude profiles, as well as the observation of seasonal changes in the overall profile. A particularly interesting set of measurements would come from flights with the UVS into polar regions during and after large Solar Proton Events (SPE's) producing Polar Cap Absorption (PCA's). Calculations (Ref. 6.9) indicate that such events produce large quantities of nitrogen oxides in the upper stratosphere, and so can reduce the amount of ozone in the polar regions. It has been reported (Ref. 6.10) that for the August 1972 SPE the predicted total ozone reduction over the poles is 20%, while satellite measurements indicate an approximately 16% decrease. UVS measurements of this effect can help determine the precise relation between SPE particle fluxes and the amount of polar cap ozone depletion.

Inclusion of a UVS in the GASP package would increase the usefulness of the ozone density data currently being obtained. The GASP ozone density data have been used to study the flow of tropospheric ozone (Ref. 6.8), and an extensive set of ozone density data from commercial aircraft over Europe and Africa has been used to study the tropospheric ozone distribution and its seasonal variations (Ref. 6.11). Use of the UVS in commercial aircraft covering a polar route might be very useful in obtaining before, during and after total ozone data for the SPE - PCA events discussed above.

The main conclusions of this report can be summarized as follows.

Conclusions

- 1) The calculated absolute accuracy in UVS measured ozone is $\pm 3\%$.
- 2) The UVS derived total ozone agrees with the Dobson data presented here to $\pm 2\%$. There may be an additional 2% deviation in UVS total ozone values derived from very high altitudes, caused by the conversion from measured to total ozone by use of measured O_3 density to estimate the columnar ozone below the aircraft.
- 3) For normal aircraft operating conditions the UVS derived ozone values are very stable, with the variability, or reproducibility, being better than $\pm 1\%$.
- 4) The UVS ozone results for the Fall 1976 Latitude Survey flights give a good latitude profile for ozone over the Pacific in November 1976.
- 5) The UVS should operate reliably and easily on the commercial aircraft of the GASP.

The main recommendations of this report can be summarized as follows.

Recommendations

- 1) The UVS would be a useful addition to the NASA package on board the commercial aircraft used in the GASP.
- 2) The procedure used to convert measured columnar ozone above the aircraft to total ozone should be refined for high altitude measurements to reduce as much as possible the deviation introduced by this conversion.
- 3) The UVS would be very useful in a program to cross-calibrate ground based total ozone stations. A program of overflights of many such stations would greatly reduce uncertainties which currently exist, particularly between the Dobson and M-83 Filter ozonometers
- 4) UVS derived total ozone measurements should be compared with satellite measurements to provide additional cross-calibration of instruments and data analysis methods. Flights with the UVS could be planned to provide precise time and location coincidence with the satellite measurements.
- 5) The UVS should be used on as many CV-990 Latitude Survey type flights as possible, in order to obtain more data on the latitudinal structure and seasonal variation of total ozone. Flights into the polar regions during and after PCA's would provide data on ozone destruction by such natural phenomena.

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